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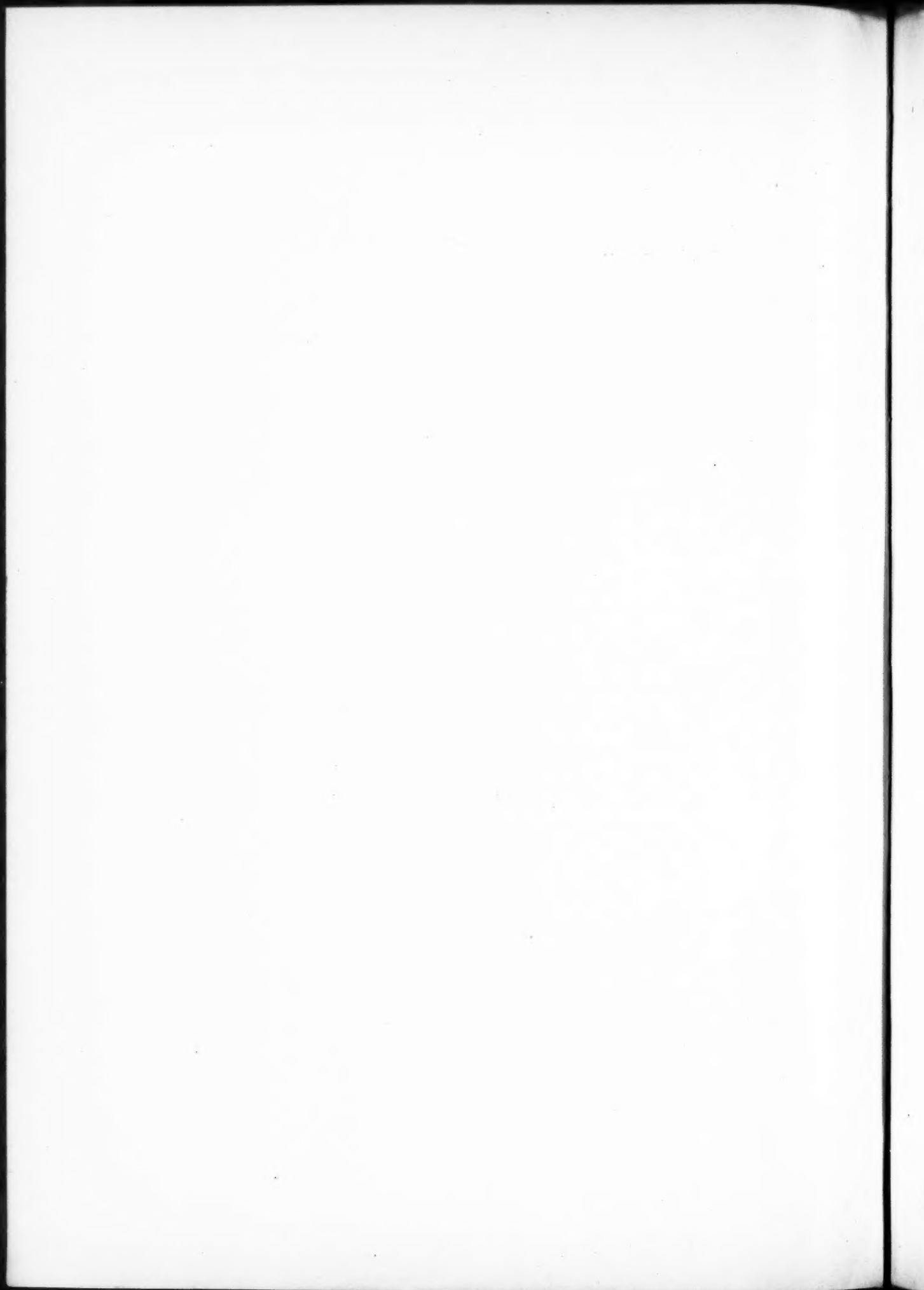
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COMMAND AND GENERAL STAFF SCHOOL

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A MONTHLY REVIEW OF MILITARY LITERATURE



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COMMAND AND GENERAL STAFF SCHOOL

MILITARY REVIEW

MONTHLY REVIEW OF MILITARY LITERATURE



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October 1943



Acknowledgment

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Air Strategy for Victory

[An article by General Henry H. Arnold, Commanding General, United States Army Air Forces, in *Flying* October 1943.]

STRATEGY is the art of war and is concerned with the ability to concentrate military force on the enemy at a given time and place. Air strategy involves all the methods by which a nation impresses its will through the use of air power. It concerns the selection of the enemy targets and the best means of their destruction from the air.

Strategy is as old as history and its general principles have changed but little down through the centuries. Air strategy, however, is as new as the long-range heavy bomber, with its ability to span oceans and continents with loads of destruction.

America's air doctrine for years has been based solidly on the principle of long-range bombardment. Air forces are strictly offensive in character. This was not generally appreciated until recently, and efforts to gear our Air Force solely to defense or to limit it strictly to cooperation with ground forces were bound to fall short of our requirements.

No longer are broad oceans or "Maginot Lines" regarded as sufficient protection. *War has become global.* Statesmen as well as generals and admirals have been forced to study globes as well as maps, and many radical readjustments in thinking have resulted. Air power has shrunk distances so that we no longer speak of a place as so many thousands of miles away, but so many hours.

Modern war is three-dimensional. No longer are armies and navies to be regarded as effective means of preventing enemy incursions. *War has become vertical.* We are demonstrating daily that it is possible to descend from the skies into any part of the interior of an enemy nation and destroy its power to continue the conflict. War industries, communications, power installations, and supply lines are being blasted by attacks from the air. Fighting forces have been isolated, their defenses shattered, and sufficient pressure brought by air power alone to force their surrender. Constant pounding from the air is breaking the will of the Axis to carry on.

The days when a nation depended wholly on its army and navy for victory have gone forever. *War has become total.* Air power brings the reality of war to the people as a whole. The laboratory and the factory, the mine and the field—all the nation's resources must be mobilized. There will be no permanent victory in the air or on land or sea without victory on the home front and that means that the enemy home front is a part of our legitimate target for air power. And the air strategy which brings victory must not be scrapped when the last bomb is

dropped. For the security of a world in which the air will be a dominating factor our wings must not be clipped.

There are three principal ways in which air power can be used—strategically, tactically, and logistically. These three aspects of air power stem back into the roots of American air thinking.

Strategic air power is a war-winning weapon in its own right, and is capable of striking decisive blows far behind the battle line, thereby destroying the enemy's capacity to wage war. The highest development of strategic air power in the war to date is found in the activities of the Royal Air Force Bomber Command, our 8th Air Force Bomber Command (now called Strategic Air Force), and Major General Doolittle's Strategic Air Force, one of the component parts of the Northwest African Air Forces, commanded by Lieutenant General Spaatz.

People are only now realizing what a vital part strategic bombing played in the earlier part of the African campaign. All through the summer of 1942, General Brereton's *Mitchells* and *Liberators* and RAF *Wellingtons* and *Halifaxes* were smashing Axis docks and shipping at Tobruk and Bengasi, and ports in Crete and Greece. More than two-thirds of the shipping laden with supplies for the Afrika Korps was sunk, and large numbers of Junkers Ju-52 transports shot down. Rommel's heavy supply line was dried up by long-range air attack.

In the Tunisian campaign this operation was repeated on a grand scale by Major General Doolittle's Strategic Air Force and other elements of RAF Air Marshal Tedder's Mediterranean Air Command. By blasting away at airdromes, ports, and shipping and shooting large numbers of air transport planes and huge powered gliders out of the air in some of the most dramatic actions of the war, we were able to isolate the Axis forces and effectively prevent their being reinforced with troops, supplies, and equipment.

Strategic air power based in England played an important, although indirect, part in the battle for Tunisia by crippling or destroying war plants in Germany and occupied France. Production of new machine tools, antiaircraft guns, motor transport, aircraft, engines, and tanks was slowed down and their flow to the front further reduced by disrupting railroad yards, blasting bridges, blowing up locomotives and freight trains.

Deprived of the weapons of war, the Axis forces collapsed as soon as the terrific drive on the battle-

field, by coordinated ground and air forces, really got under way. Thousands of lives were saved, and weeks of time, as compared with the mile by mile, village by village method of classical warfare, which has always proved so costly in a war of position. By this action we again proved the sky road to both Berlin and Tokyo can be utilized to the full to blast the heart out of the citadel before our combined operations take over for the final drive.

The Army Air Forces principle of precision bombing, aimed at knocking out not an entire industrial area, nor even a whole factory, but the most vital parts of Germany's war machine, such as the power plants and machine shops of particular factories, has had many illustrations during the past few months. The mission against the submarine works at Vegesack in March was a notable example of precision bombing. With their eyes on the targets, and using an automatic device enabling them to exercise direct control of the plane during the bombing run, our bombardiers dropped some 250 tons of bombs, hitting seven out of fifteen submarines actually in the construction ways, and inflicting heavy damage on the power plant and seventeen other key buildings.

On May 14, in the 1,000-mile round trip mission against the U-boat yards at Kiel the actual bombing results were even better. About 287 tons of bombs were dropped by 125 of our heavy bombers, and reconnaissance photographs indicate that nearly every bomb landed smack in the target area, inflicting terrific damage.

A secondary result of these engagements (each one of which is sufficiently important to call an air battle) is that the Luftwaffe has been forced into defensive action. Single-engined day fighters of the latest types, including souped-up, heavily armed versions of the Messerschmitt Me-109 and Focke-Wulf Fw-190 are being thrown in with desperate determination to stop these bombings at any cost, and many such fighters have been shifted from other areas. We have proved that they cannot stop us. Our heavy bombers are shooting them down in substantial numbers, and recently we have had the added protection of a number of modified fighter versions of the *Flying Fortresses*, so heavily armed they are called "flying hedgehogs." Knocking the Luftwaffe out of the skies continues to be one of our main jobs. During April, May, and June our bombers and fighters shot down 821 German planes over Europe, against 183 of our own, a ratio of $4\frac{1}{2}$ to 1; including "probables" it is about 6 to 1. In order to hold their own the Luftwaffe would have to destroy our planes at the ratio of 2 to 1. There is growing evidence that the Luftwaffe, spearhead of the early Nazi triumphs, will prove to be the Achilles heel leading to the collapse of Hitler's ill-fated "new order."

An outstanding example of the possibilities of strategic bombing dealing a powerful, paralyzing

stroke, is the great attack on the Rumanian oil refineries at Ploesti by 177 *Liberators* of the 9th Air Force, Middle East. It is the most important single air blow of the war to date.

Two air engagements which took place during the first half of 1943 will have an important place in the history of warfare. The first is the remarkable victory of the Bismarck Sea during the first four days of March in which land-based air power alone decisively stopped and then annihilated an enemy invasion fleet. The second was the virtually all-air conquest of Pantelleria in June, another milestone in the development of military aviation.

The Bismarck Sea victory was notable for its completeness, for the perfect integration of various parts of the attacks, and as an example of direct air assistance to ground forces by destroying an enemy division, with its supplies and equipment, before it could even get into action.

Probably the most far-reaching effect, however, was its conclusive demonstration of the effectiveness of minimum altitude bombing, sometimes referred to as skip-bombing, a phrase which is hardly descriptive of the main features of this important new technique. Developed at Eglin Field early in 1942, each theater has worked out its own application of the basic theory. It has been used with great success in the Mediterranean and the Aleutians as well as the Southwest Pacific, and has its applications to land as well as sea operations.

On the island of Pantelleria the all-out air assault was so overwhelming and so concentrated that the defense was saturated and surrender became inevitable. This engagement has often been compared to Crete, but the difference is fundamental. Crete was lost to airborne troops who landed and fought it out with defending ground troops. The white cross on Pantelleria's battered airdrome before a single soldier or sailor landed is a symbol of the ability of air power to capture any citadel once its own supremacy in the skies is established, and provided a sufficiently sustained and powerful air assault can be brought to bear against it. It is simply a matter of mathematics (or physics). While air assault is not without cost, this type of warfare is actually cheapest on all counts and it is by far the greatest economizer in human lives.

The American doctrine of total air power, while emphasizing the tremendous possibilities of strategic bombing, has always included the idea of close cooperation with ground forces as a team. In our development of attack aviation in the early '20's it was established that the air arm was not to be regarded as merely for support of ground actions, but that it could act by itself, under the high command, by attacking from the air the same objectives as the infantry and artillery attacked from the ground.

This principle has seen its finest development to date in the operations of the Tactical Air Force in

the Tunisian campaign. General Montgomery of the British 8th Army was convinced that to secure the concentration and the flexibility required of air power on the battlefield, the air operations should be under an air commander, the ground operations under a ground commander, and that both of these officers should be on the staff of the commander-in-chief of the theater and work together in the closest possible cooperation. This was done in Tunisia, and together with the work of the Strategic Air Force and the equally vital (if less spectacular) services of the Coastal Command, the Air Service, Air Engineer and Troop Carrier units, the Reconnaissance Wing, and the Operational Training Command, the results were terrific. A pattern for victory has been clearly established.

Another highly significant development of the present war is that at last logistics, the art and science of military supply, has taken to the air on a grand scale. This does not mean, of course, that any considerable bulk of the requirements of the Air Forces (or of the Army generally) are being flown

to the combat areas in transport planes. Shipping is vital in this war of immense distances, and our country's outstanding performance in exceeding its heavy quota of merchant ships and getting the stuff to our widely scattered theaters of operation will constitute no small part of the final victory. However, it is unquestioned that the remarkable spread of American air power to ten fighting fronts in all parts of the world within less than a year of the attack on Pearl Harbor is very largely due to the rapid pioneering development of the Air Transport Command. Organized in May, 1941, to ferry lend-lease planes, the ATC has expanded in a little over two years to a world-wide airline operating more than 110,000 miles of airways over five great routes, with all the airfields, hangars, gasoline storage facilities, communications, and weather reporting service that this implies. Over these routes a steadily increasing stream of combat planes is being ferried daily, and impressive quantities of high priority supplies and equipment, besides key personnel, are transported to the fighting front.

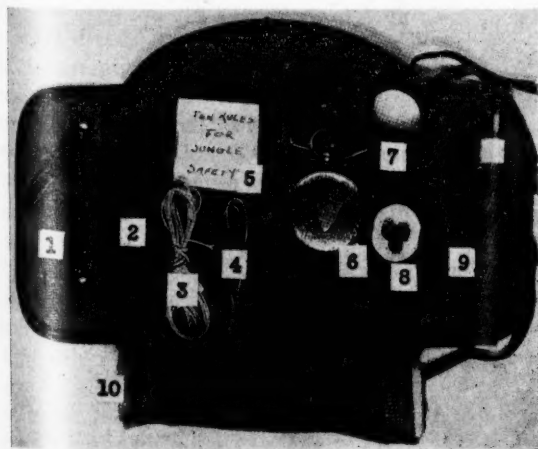
A Pocket Jungle Kit

INSPIRED by Frank W. Lane's "Self-Preservation—The Law of the Jungle"* in the April MILITARY REVIEW, Lieutenant Louis Ginsberg, QMC, has constructed a pocket kit which he believes to contain the basic necessities for life in the jungle.

As pictured and described in the *Quartermaster Review* for July-August, 1943, the kit contains the following articles: 1, pocket knife; 2, fish hook and line; 3, length of extra-strong twine; 4, length of strong wire; 5, *Ten Rules for Jungle Safety*, suggested by Frank W. Lane's article and printed on waterproof paper; 6, compass; 7, glass for starting a fire; 8, iodine crystals in waterproof container; 9, matches in waterproof container; 10, mosquito net for head covering; all packed in an ordinary waterproof sewing-kit case.

This pocket-size kit weighs approximately ten ounces and is about one-tenth the size of the standard Air Corps jungle kit which weighs six or seven pounds. The latter contains a machete which, of course, cannot be included in the smaller kit.

This kit, or something similar, may be constructed by any soldier with a minimum expenditure of time and effort from articles that ordinarily are easy to obtain. It may be carried at all times without discomfort over jungle terrain.



*Reprinted from an article in the *Royal Air Force Quarterly* September 1942.

Reconnaissance—Sine Qua Non

LIEUTENANT COLONEL JAY C. WHITEHAIR, *Cavalry*
Instructor, Command and General Staff School

VISUALIZE a soldier with a physique like Joe Louis. Train him, equip him, give him a loaded rifle and a bayonet, and you have a potential killing machine. Now tie a blindfold over his eyes so he can't see where he is going or where his opponent is and you have a helpless human being. Multiply this helpless human being by many thousands, add the necessary supplies, trucks, and equipment, and you have an infantry division without reconnaissance.

So that we may start on a common basis let us define the word "reconnaissance" as the process of searching for information regarding the enemy, terrain over which the enemy is operating or over which we may operate, and the resources of the area.

Let us also distinguish between purely passive observation and aggressive reconnaissance. The latter being an active, never-ending quest for information, toward which all efforts must be bent.

How important this information is to a commander cannot be overemphasized. No commander can be faced with a worse dilemma than to have to make an immediate decision without having information of the enemy and terrain available upon which to base his decision.

It is for this reason that the commander himself must be responsible that reconnaissance be conducted continuously.

When the commanding general announces his Essential Elements of Information (EEI), he is giving an order to G-2 to concentrate on that information which he considers vital. G-2 now assigns missions to his agencies, primarily based on the EEI. He must be specific. He can't get it all, so he must bear down on those items of major importance comprising the EEI. He must determine exactly what is wanted, where to go to get it, and when reports are to be submitted.

Battle experience in North Africa and the Southwest Pacific has proven again and again that specific requests must be made to the reconnaissance agencies in order to get specific information. Vague assignments produce vague results. We shouldn't ask: "Is there any artillery on our front?" but rather, "Where, how much, what kind of artillery is in area X?"

When to report cannot be stressed too much, when one considers that one-half hour's notice of a German antitank trap in Libya in the summer of 1942 would have saved the British the loss of 80% of their medium tanks, and an action which resulted in a sweeping Axis victory.

Units must be trained, however, to report certain

items of information as normal procedure: for example, first contact with the enemy, types and condition of roads and bridges, road blocks, mine fields, map errors, and air attack or tank attack. These last two items of information will normally be transmitted by means of the Warning Net.

Let us consider what agencies and sources are available to the corps and division G-2 to collect the tremendous amount of needed information.

There are aviation, the corps cavalry regiment, the division reconnaissance troops, regimental intelligence and reconnaissance platoons, infantry patrols (foot and motorized), artillery intelligence sections, special units, attached troops, higher, lower, and adjacent units, and personal reconnaissance.

Perhaps it will be easier to visualize the use of these, if we refer to the sketch of an infantry division, part of a corps, in its march to contact. (Figure 1.)

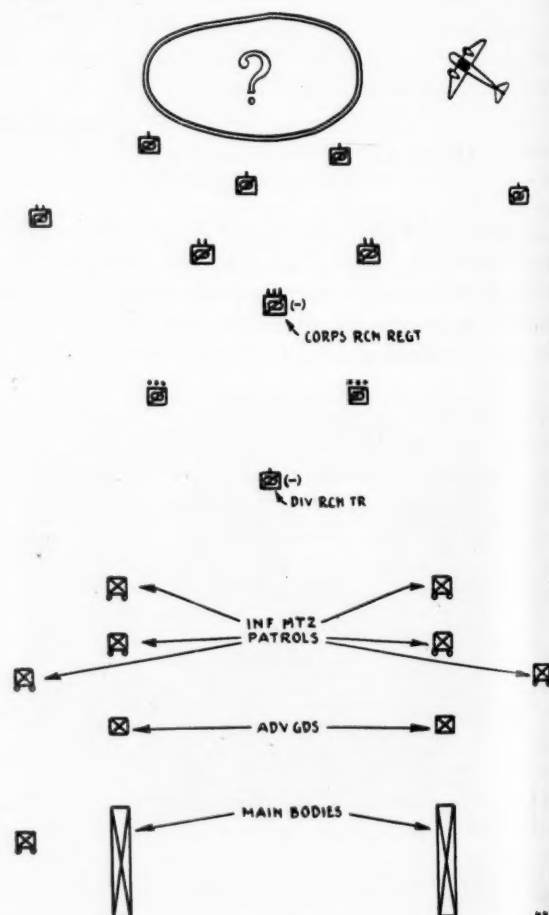


FIGURE 1.
INFANTRY DIVISION, PART OF A CORPS,
MARCH TO CONTACT

Let us now consider these, starting with those agencies which are out in the distance. It is important to note that the farther out our agencies may be, the more interested we are in general information; and as contact grows closer, reconnaissance must intensify for the purpose of securing more detailed information. For example, the corps commander is interested in how many divisions are out there, what direction they are moving, what type of divisions they are. Whereas the platoon commander is interested in the exact location of the machine gun which is holding up his advance.

Let us first take up the matter of aerial reconnaissance. We will not go into the technique of the reconnaissance itself as that is beyond the scope of this discussion. However, it is necessary to discuss this sufficiently to fit aerial reconnaissance into the over-all picture and to show the tremendous need of the ground troops for this most valuable agency.

First, we can divide reconnaissance into distant and close. Let us use the name "distant" in this discussion to denote that reconnaissance which is over one day's march from our main body. Please notice that this is a function of time rather than space by reason of the fact that one day's march in a swampy jungle is vastly different from the march of an armored division over open terrain.

It is our greatest hope that aerial reconnaissance will be able to pick up the large movements of bodies of troops in the distance, and can get us specific information as to direction of movement, time observed, composition, and disposition. For, aside from the fortunate G-2 who has reliable agents working in enemy territory, this may be the only means of early information that we have.

Furthermore, this early information may generally outline the enemy for our distant mechanized reconnaissance elements, so that we may send the limited number of agencies that we have in the proper direction and at the proper time. Speaking of the importance of this aerial reconnaissance, it was interesting to note the letter of a recent graduate of this School, written from Guadalcanal, in which he stated that 85% of the enemy information in that area was secured by aerial reconnaissance, by reason of the fact that all reinforcements were coming in by water.

In close reconnaissance the air is no less important. Specific information can be reported in regard to the movement of the enemy's reserves, artillery columns, defense activities, and possibly tank traps. A recent report from a Division G-2 in Africa stresses the tremendous importance of this reconnaissance, particularly at night. It was found that the enemy was making practically all of his dispositions for attack during the night, and was then making his jump-off about an hour before daylight. This brings up the crying need for aerial photographs being delivered to the ground force which is

about to be attacked, in time for it to shift its forces to best meet the enemy.

Needless to say there are certain limitations to aerial reconnaissance, which we must consider and make plans to counteract; such limitations as the weather, the probable use of cover by the enemy, the inability of the air to obtain detailed information and identifications. These limitations necessitate the supplementing of aerial reconnaissance with ground agencies.

This brings us to our first ground agency. The corps reconnaissance regiment, a lightly armored mobile organization, composed of reconnaissance troops and support (tank) troops. This organization is capable of reconnoitering an area 45 to 60 miles in width and 125 to 150 miles in depth.

When this regiment receives a mission of reconnoitering an area, the procedure within the organization may develop along these lines: The regimental commander may subdivide the area (after a map or terrain study) into two squadron sectors, assigning a squadron headquarters and sufficient troops to each sector, while still retaining a proper reserve. The squadron commanders may further subdivide their respective sectors into troop sectors and make corresponding assignments. This subdivision of areas may continue on down to the point where the "front" of the regiment consists of dozens of little elements working their way forward toward the suspected area.

As resistance is met by any one of these elements, it attempts to sidestep to continue its search. However, eventually the process of sidestepping will usually be stopped along a general line by the uncovering of the enemy "screen." It is here that "sneak and peek" methods may have to be abandoned and power reconnaissance employed as shown in Figure 2.

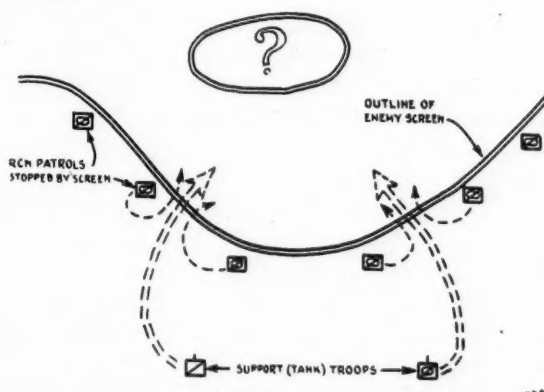


FIGURE 2.

The squadron commander having received the reconnaissance elements' reports that they are unable to proceed, makes a decision, based on these reports, as to where he will attempt to "crack" this line. He then orders his light tank troop to that spot to "break through," so that the light reconnaissance

elements may continue their search for the mass of information behind the screen.

Behind the corps cavalry regiment we may find the division reconnaissance troop. It has practically the same composition as the reconnaissance troops within the regiment. This troop is capable of reconnoitering an area with a normal road net, 15 miles wide by 50 miles deep. If the corps cavalry regiment is not present, it may be necessary for this troop to take over some of the missions which normally would have been performed by the regiment. When contact has been made with the enemy, this troop is normally withdrawn to the flanks and may then be employed to reconnoiter to the flanks of the enemy or to make distant reconnaissance to secure information of any reinforcement of the enemy, or may be brought into reserve.

We find an intelligence and reconnaissance platoon within each infantry regiment. This platoon finds its maximum value in close-in reconnaissance work, traveling normally from three to five miles in front of the point of the advance guard. However, if the division reconnaissance troop is not present, it may have to take over some of its duties. While the platoon is not equipped to fight, other than with small arms, it may operate even in close contact with the enemy by using stealth and other evasive methods.

All commands must constantly surround themselves with small patrols, which will work as far into enemy territory as is humanly possible. During the Tunisian campaign one division sent patrols of 10 to 12 men deep into enemy territory at night, where they maintained themselves for several days on end. Having secured successful observation points, the patrols sent their messengers out at night with the information gained during the day and, by replacing these messengers with fresh men, successfully made their reliefs. Another division found that they had success operating with patrols of two men, who had been trained in scouting and patrolling, including map reading, observation, and message writing.

This division reported that when the men were sufficiently skilled, the information they brought back was invaluable; but when the men were not properly trained, they were usually never seen again.

This mission of patrolling is tremendously difficult to perform. Men not properly trained and without proper *esprit* are worthless. It is almost impossible to overemphasize this in training. As one Division Commander put it: "As long as the Germans out-patrolled us, they had the initiative, but as soon as we started to out-patrol them, the initiative became ours."

Motorized patrols are also constantly used from which the individual foot soldier may operate once the patrol is well into enemy territory.

The headquarters and battalions of the division artillery have within them intelligence sections. One of their specific jobs is to pass on to the division G-2

information which they have secured. We might pause here to mention that no unit in the Army fights harder to get their officers and men up to forward observation posts than the artillery. In many instances these forward observers will be found almost within enemy territory. In addition to these ground OP's the artillery is equipped with cub planes. These cub planes have come in for a tremendous amount of discussion, both pro and con. Prior to the Tunisian campaign a great many officers felt that the cubs could not exist in the air in an active theater. However, one division reported that at Fondouk, where the enemy held the high ground preventing our ground agencies from successful observation, most of the information which it received concerning enemy artillery and reserves came from the artillery cubs. It was also the belief of the G-2, along with others, that it would become an increasingly important agency.

There are many service and attached units which are of extreme value to G-2, such as the engineers in securing information of mine fields, roads, and obstacles, the Medical Corps in reporting the location and type of injury of the wounded, the tank destroyers' reconnaissance companies in reporting hostile tank attacks, and so on. However, it is necessary that G-2 be careful not to assign missions that will take these special units away from their primary missions. In connection with this, G-2 must be extremely quick to consider the potentialities of any attached troops which he may have. Also of extreme value will be the reports of adjacent units, or units which are being relieved, or higher headquarters.

Let no one minimize the value of personal reconnaissance. It is often the difference between success and failure. This war is filled with examples of the personal reconnaissance of higher officers, both by air and by ground. It is not only an extremely high morale building factor, but the information actually obtained is much better than that which is second hand.

The commander of a unit may decide, under certain circumstances, that certain information is so vital that it is worth committing a portion of his command to the definite task of attacking the enemy to secure the information. This action is called a "reconnaissance in force." This type of action may be such an important undertaking that G-2 of his own volition may not be able to plan and execute the mission. A "reconnaissance in force" is generally used only when the information cannot be secured in any other manner. It consists of a strong attack, often involving all arms, for a specific purpose. This purpose may be either to gain observation into enemy territory, to secure prisoners, or perhaps to gauge the enemy resistance itself. Normally it will have a limited objective and it may not be planned to hold the captured ground for a prolonged period.

A typical example of where a "reconnaissance in force" may be used might be as follows: An infantry division is facing an enemy who holds the high ground within an area. Indications point to the fact that reinforcements have started to move up from the enemy's rear. It is of extreme importance to the commander to find out whether these reinforcements will eventually arrive behind the enemy on his front or at some other location. Due to the plans of higher echelons for the use of the tactical air force it may not be possible to secure an aerial reconnaissance mission in this area. The commander may then be faced with the necessity of an actual attack at some part of the enemy's line to secure high ground for a long enough period to find whether or not the reinforcements have arrived on his front.

COUNTERRECONNAISSANCE

Counterreconnaissance is the weapon in the commander's hand to screen his own movements from hostile observation. It is the process of limiting the effectiveness of enemy reconnaissance agencies.

Counterreconnaissance may be divided into two types: offensive and defensive.

Offensive counterreconnaissance is an active search for the enemy reconnaissance agencies in order to defeat them before they are able even to start their reconnaissance. Certainly by far this is the most effective means of preventing the enemy from getting information concerning us.

The air force may be employed to bomb the enemy airfields and destroy the enemy aviation on the ground. This war is filled with examples of the success of this operation. Perhaps the operation is so closely intermingled with combat missions themselves that there can be no line of limitation as to which is a counterreconnaissance activity and which is an action for the pure securing of air superiority.

The ground forces seek to contact the enemy reconnaissance agencies also at a distance and destroy them either by ambush or other means of combat. Cavalry units with proper reinforcements, or armor, because of their mobility are extremely valuable on these missions. They will operate by sending out their own reconnaissance agencies well in advance, and as a result of the information gained thereby close with the bulk of the enemy, attempting to destroy his supporting detachments as well as his reconnaissance elements.

In defensive counterreconnaissance we fight to prevent the enemy reconnaissance agencies from getting in to where they can get information concerning us or to destroy them before they can transmit their messages.

Here we will find some portion of the fighter command of the air forces attempting to destroy any enemy air before it can get the information or report back.

We find antiaircraft units being employed not only for the purpose of destroying enemy aircraft but also

for the purpose of keeping enemy aircraft either too high to make proper observation or away from an area entirely.

The ground forces set up what is called a "screen" for the specific purpose of preventing enemy reconnaissance from entering a certain area. Normally these screens are set up behind some type of obstacle such as a river or a range of mountains, the obvious reason being that it is almost impossible otherwise to so locate your units that they can cover all of the terrain and prevent any patrols from getting through. Screens may be either moving or stationary. In the use of a moving screen a series of obstacles is found useful. Screens may be used to deny the enemy information of concentrations of our movements to an attack position, to screen a withdrawal, or perhaps to screen the extent of our flanks.

SUMMARY

It should be stressed that reconnaissance and counterreconnaissance are not the same thing and should not be assigned together. For in reconnaissance we so dispose our units that they may keep concealed if possible. We instruct them not to fight except to gain information. In addition they orient themselves on the enemy. Whereas in counterreconnaissance the primary mission of our units is to fight to prevent the enemy from getting information about ourselves. This involves a certain concentration of force, a disposition which will leave the units ready for combat, and the units orient themselves on us rather than on the enemy.

How many times one hears or sees orders that direct, "X Rcn unit will protect the south flank of the main body and reconnoiter to the line A-B (miles away)."

One might as well order an infantry regiment to attack at once but not commit any of its battalions. The two parts of the order are in direct conflict. The unit commander who receives it must decide, in the absence of further orders, either to divide his force and do only half of each job or else establish his own priority and accomplish one mission to the exclusion of the other.

There is a tremendous necessity for complete understanding and coordination between G-2 and G-3 in the assignment of missions.

If the missions assigned are beyond the capabilities of the unit, or are such that the unit is not free to proceed with single-minded concentration, then the reconnaissance will suffer. When the reconnaissance fails, the information doesn't come in. When the information doesn't come in, we are stumbling in the dark. With an enemy versed in antitank traps, mine fields, armored tactics, rapid counterattack, and all other mobile operations, this is no time to stumble off balance through a dark fog.

So again we say: "Remember, Reconnaissance—Sine Qua Non."

Gasoline Supply in the Combat Zone

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THE PURPOSE of this article is to discuss the distribution of motor fuels and lubricants in the combat zone, the available means of distribution, and how these means are utilized to set up a working Class III Service. Most of us are familiar with some or all of the tools provided, but few have seen the complete system in operation.

In physical characteristics, articles of Class III supply are unique, and the methods of making them available to those who use them vary in some respects, both in principle and practice, from the methods common to most other classes of supply. Their importance is unquestioned, the military use of petroleum products has grown from the occasional can of axle grease in the days of the escort wagon to where it exceeds the bulk and tonnage of ammunition, long the number one supply problem of a fighting army.

The mobility of a modern army depends on a chain of supply that must reach back to the oil well and refinery in the zone of the interior. Unlike the horse and mule, a motor vehicle that is idle requires nothing. On the other hand, a military unit on the march can consume in one day fuel that will total many times the weight of one day's rations. This long chain of supply, often stretching back over thousands of miles of land and sea, must be so flexible as to meet both these extremes of demand. It must be so mobile that it can continuously support a moving military unit wherever it may go. It must be reasonably secure against interference by the enemy.

In order to discuss the subject of motor fuels and lubricants, that is, Class III supply, in a combat zone, we should first review the organization of a theater of operations. Assume that a typical theater, aside from its Air component, consists of a communications zone and a combat zone, operated respectively by a service force known as the Theater Services of Supply (SOS), and a ground force consisting of a Field Army of several corps and divisions together with nondivisional troops of appropriate arms and services.

It is part of the function of the Theater SOS to provide all the supplies needed by the Field Army, moving them in SOS transportation to Army installations in the combat zone. It is likewise the responsibility of the various subordinate units of the Army to come, with their own organic vehicles, to these same Army installations and carry away the supplies that they require. The operation of the installations themselves is a responsibility of the Field Army. They are the pools in which the Army keeps

its reserve stocks, and at the same time are the valves through which the Army exercises control of the flow. That is the basic ideal relationship between the SOS, the Field Army, and the various subordinate units in the combat zone. It is one basis for the geographical assignment of responsibilities within the Theater. Frequently, however, there is a gap between the most forward point to which the SOS can move supplies and the most rearward point to which combat units are able to travel. This gap must necessarily be filled by the Army itself, with installations and transport manned by Army personnel. And all along the line, scattered from front to rear throughout the Army service area, units are located which themselves must be supplied as well as the troops which are actually doing the fighting. These three links in the chain of storage and movement of supplies, the SOS, the Army, and the using unit, are present in all classes of supply. Let us see how they specifically apply to the distribution of motor fuels and lubricants.

CLASS III SUPPLY IN THE FIELD ARMY

Like all other classes, motor fuels and lubricants come to the Army in SOS transportation, either rail, water, or motor, and are delivered to the principal Army Class III installations according to the directions of the Army Quartermaster. The Army Quartermaster has a division or section of his establishment devoted entirely to the management of the Army Class III Service. This service consists of Quartermaster Gasoline Supply units, organized into companies and battalions. The Class III officer is responsible to the Army Quartermaster for the proper functioning of the Army link in the Class III supply chain. On the one hand, he must be able to provide units of the Army with their fuel requirements on demand; on the other hand, he must anticipate the Army's total needs days in advance, for the SOS will send him exactly what he asks for, no more and no less.

The Class III officer, acting for the Quartermaster, disposes his means throughout the Army service area, sometimes well forward into division areas, according to the concentration of vehicles and the needs for fuels and lubricants. His installations vary in size, some requiring entire companies, others getting along with three or four men. The largest ones are the points at which unit requirements, truck-loads or more, are met. Others are for the storage of Army reserves, Class III Depots. Still others, much smaller as a rule, are for the service of individual vehicles. All of these Army installations can be operated by various combinations of or detachments from basic

Quartermaster Gasoline Supply units. Still another type of service, operated from one of the above installations is a delivery service direct to small units having requirements too small to warrant the dispatch of a vehicle.

MOVEMENT OF CLASS III SUPPLIES

In addition to locating supply points and depots at which his supplies are stored and issued, the Quartermaster must provide for the *movement* of these supplies into his installations. In general, he accomplishes this by requesting the SOS to deliver them to the exact points at which he wants them. This takes care of stocking his larger installations. Gasoline Supply units have a certain amount of organic transport which should be used to the utmost in making deliveries to other Army supply points, particularly smaller ones, to which direct service by the SOS would be uneconomical or impossible.

The direct delivery by SOS to Army supply points is only possible when such shipments are made *by truck in five-gallon drums*. Shipment to the Army in fifty-five gallon drums or in tank cars, tank trucks, or ships requires the establishment of yet another type of Army installation, the "refilling points," at which fuels are transferred to the five-gallon container for handling in forward areas. Because of the vulnerability of these points to enemy air attack and the additional possibility of accidental destruction, these refilling points are usually located in secluded spots. No issues are made to consuming units at these points.

NECESSITY FOR TRAINED PERSONNEL

Gasoline supply operations are relatively sensitive as supply functions go. They must be performed by trained personnel. While the details of operation are essentially routine in nature, all personnel must be impressed with the precautions necessary to prevent the mixture, adulteration, or contamination of fuels, to prevent fires and explosions, and to prevent the physical harm to personnel that can result from careless exposure to gasoline and its vapors, it is entirely possible, however, to augment the capacity of Gasoline Supply installations by the attachment of Quartermaster Service troops, provided that adequate supervision by qualified personnel remains. The transport functions of the Class III Service can be reinforced by the use of Quartermaster Truck units; in fact, this is commonly done. This reinforcement should not be done by attachment ordinarily, but rather by the assignment of missions to Army Quartermaster Motor Transport units for the moving of larger quantities from point to point. The actual issue of Class III supplies and the maintenance of depot stocks should always remain in the hands of Gasoline Supply personnel. Only in this way can close and efficient control be constantly maintained.

While the Army Class III Service makes motor fuels and lubricants available both to units and individual

vehicles, it should be explained that certain subordinate units within the Field Army are charged with a continuation of this function. Certain larger consumers, such as divisions and even some regiments, battalions, and companies, are organically provided with fuel reserves. These reserves consist of a number of containers together with the vehicles necessary to transport them. All such units are charged with the establishment of their own unit supply points, within their capabilities, in order partially to relieve the Army of detailed distribution within these commands. That is not to say that the Army will not assist these units during peak periods, but it is expected that units will use their own means to the utmost before assistance is requested.

The Army Class III Service, then, consists of several parts. It consists of the *installations*: i.e., the depots, refilling points, and supply points at which issues are made and reserves are stored. It also consists of the *transportation*, the organic vehicles of the Quartermaster Gasoline Supply units which assist in moving these supplies forward in the Army link of the supply chain. The whole service is directed by the Class III officer, under the direction of the Army Quartermaster.

HOW THE CLASS III SERVICE OPERATES

Having drawn a picture of the Class III Service, let us see how motor fuels flow through it from the source of supply to the ultimate consumer. In addition to the built-in fuel tank each vehicle carries an additional load of one or more five-gallon drums. The fuel contained in the vehicle tanks and drums together forms the first echelon of fuel reserves. As fuel is consumed from the tank of the vehicle, the operator replaces it with fuel from the spare containers carried, and at the first opportunity replaces empty containers with full ones. The replacement for these empty containers may come from the unit reserve which, as we have seen, should be used to establish local unit supply points generally accessible to individual vehicles. If the vehicle in question happens to be one that makes trips to rear areas for any purpose, this exchange, empty or full, may have taken place at an Army supply point, some of which are located to service individual vehicles.

The next normal step backward along the chain of Class III supply is the *unit supply point*, operated with the drums and vehicles of the divisional or smaller unit reserve. After a number of exchanges of full containers for empty have taken place at this point, unit reserves are replenished by sending a vehicle load of empty drums back to the *Army supply point*, where they are again exchanged for full drums. This exchange is usually made at one of the larger Army supply points especially designated for truck-load exchanges. In the same manner, the Army will refill its own smaller supply points by bringing back empty drums to the more centrally located larger in-

stallations, using organic Gasoline Supply transportation.

We should emphasize at this point the necessity for single vehicles refilling with fuel when they are in rear areas for any purpose. Since each vehicle has a tank and drum capacity the equivalent of several days of ordinary travel, it can take care of all of its own fuel needs if it makes so much as one trip to the rear every other day. In addition, an alert supply officer can fill many of the other vehicles of his regiment or separate battalion out of the drums on trucks which make regular trips to the rear. Widespread employment of this method of refueling will not only reduce the number of special trips for fuel, but will assist in smoothing out the peaks and valleys of demand at Army supply points. During slack periods, gasoline supply personnel must use every device to push distribution. If they do not, a sudden urge to refill on the part of the Army as a whole may find them unable to meet the accumulated requirements.

LOCATION OF INSTALLATIONS

Smooth and efficient operation of the Army Class III Service depends in large measure on timely and intelligent selection of the locations of its installations. All of them must be placed with due regard for their convenience to using units, the movement of traffic, concealment and protection, and safety for themselves and for other activities in their general area.

Convenience to using units is important. We must bear in mind at all times that the primary purpose is to serve others. In this connection, again, we must remember that units provided with organic reserves must be required to bear their share of the effort of forwarding Class III supplies. All such reserves should be actively employed in the fuel replenishment system. There is no practical advantage to holding them inactive and idle when their units actually need resupply.

The flow of traffic will influence the location of Class III installations. They must be sited so as not to interfere with general traffic in the area, and their internal arrangement must be planned to facilitate the movement of vehicles through them.

Protection is not only provided by means of local active and passive defense measures. Protection of supply lines in general requires that they be located squarely behind the main tactical forces in order that full advantage be taken of this shield. In addition, any installations at which supplies are stocked on the ground must be located far enough to the rear that they will not be disturbed, either by minor fluctuations in the locations of combat troops or by small enemy parties which find their way through the forward areas.

Class III supply points are highly vulnerable due to the nature of the commodities which are handled. Careful concealment and wide dispersion within the

installation are necessary. In order not to endanger other installations, large Class III depots and supply points should be well removed from areas in which other service activities are operating. This works both ways, isolation being one of the safeguards against accidental damage to the gasoline installation itself.

Army Class III Depots, being established for the primary purpose of holding reserve stocks, should be located with respect to the most probable need for emergency supplies. In addition, their size and purpose will usually dictate that they be located farther to the rear than other Class III installations, and extremely well concealed and dispersed.

The smaller Class III supply points, established for the service of individual vehicles, should be located at focal points of traffic; for example, at Class I supply points, ammunition supply points, and the like. Small stocks and frequent replenishment of these Class III supply points will permit their establishment closer than is usual to other service activities.

Continuity of supply is maintained by continuous reconnaissance for new locations in the direction of any possible new demand. Since supply points normally can not be moved readily to accommodate one unit without leaving some other without service, a moderate reserve of Gasoline Supply units is maintained uncommitted, ready to move on short notice to critical points.

Extremely large emergency demands, as for the refueling of an armored division, are met by the use of Army Depot reserves loaded into Quartermaster trucks and dispatched to a prearranged meeting point. Refueling of equipment of the armored unit should be accomplished where possible by the use of its own unit reserves, later replenished by exchange of drums with those brought in by the truck column. Attempts at direct service to individual armored equipment from the Army truck column are seldom successful because of the difficulties of coordination. Such an operation results in undue scattering of the drums and thereby hampers future resupply operations.

DETERMINATION OF CLASS III REQUIREMENTS

While it is the function of the Quartermaster to have on hand sufficient stocks to meet the immediate requirements of the Army, it is necessary for him to predict those requirements for several days in advance. He must furnish gasoline on demand, but must wait several days for his requisitions to be filled. It is true that the Quartermaster has at his disposal a certain reserve in his depots and supply points, but these are entirely inadequate for complete reliance to be placed on them. The daily demand for motor fuels can vary between very wide limits. The Quartermaster must attempt to predict these requirements, ordering today what he may expect to require for the period several days hence.

Three main factors enter into this forecasting. The first of these is the normal day-to-day consumption of all the units of the Army, an amount which is relatively stable and which both the unit supply officer and the Quartermaster can predict with ease.

The second factor is not so easy. It is the consumption which results from tactical operations and the sudden emergency movements of large numbers of vehicles. Examples are long marches of large motored units, and large emergency supply movements. This consumption occurs as the result of operations, the nature of which prevents much in the way of advance notice. The Army Quartermaster is usually in a much better position to anticipate this consumption than the regimental or separate battalion supply officers.

The third factor which enters into forecasting future demand arises from the consumption incident to the other two. Vehicles carry in their fuel tanks and drums sufficient fuel to last them through several days of ordinary operations. It is the unfortunate but common tendency for units to neglect their vehicle fuel reserves, deferring replenishment until the vehicle is almost empty or until an impending operation suggests the necessity for full tanks. In the aggregate, the fuel carried in tanks and drums represents several days effort on the part of the Quartermaster Class III Service. A sudden concerted attempt by all units to replenish a large shortage obviously would find the Quartermaster unable to cope with the situation. It is necessary for the Quartermaster as well as the regimental or separate battalion supply officer to keep informed as to the extent of this potential demand at all times, not because he can hope to meet it regardless of its size, but in order that he can control it and keep it to the minimum.

The Quartermaster, then, must receive from all units both information as to anticipated needs and also a status report showing the extent of the fuel shortage which exists in the units. Of the two, the status report is the more important to the Quartermaster because as a rule he is in a better position to gauge the future than the unit supply officer.

The unit's status report is incorporated into the daily telegram, while the estimate of future needs can be transmitted as required.

It is important that everyone have a positive, definite, and clear picture of just what information is required. The exact nature of the information and the exact period covered must be thoroughly and uniformly understood.

By collecting these figures in tabular or graphic form, the Quartermaster can not only watch the current position of the Army with regard to fuel, but can use unit estimates to check his own predictions as to future consumption. His requests to SOS are in the form of requisitions, setting forth the amounts desired, the time and place desired for delivery, and

perhaps even the mode of transport or the type of container.

In discussing Class III supply, our attention has been focused on motor fuels, while little mention has been made of lubricants. Motor fuels form perhaps 95 percent of the bulk and weight of Class III supply. Lubricants are supplied in exactly the same manner, through exactly the same channels. It is advantageous to prescribe maximum stocks of lubricants which are to be carried by any unit or installation. This not only prevents over-stockage and hoarding, but permits statistical treatment identical with that given to motor fuels. It is not as necessary to pay close attention to stocks of lubricants as it is to fuels, for the bulk and weight of many days supply is usually negligible. For that reason relatively larger reserves can be carried all along the line, easing the whole situation.

Successful supply of motor fuels and lubricants depends on everyone holding up his job. If the driver neglects to refill his tank at every opportunity, he starts an endless chain of trouble for all concerned. Daily replenishments of consumption must be made in order to minimize the accumulated demand, which if allowed to get out of control can overwhelm the whole Class III Service.

Unit commanders and their supply officers must assist and enforce this refueling process. They must see that individual vehicles *do* refuel on every trip to the rear. They can ease their fuel situation still further by taking full cans off those vehicles to refuel those which do not ordinarily reach rear areas. The unit supply officer must compile daily an accurate report of fuel shortages and an estimate of future needs, in order that Army may have a basis for planning the flow.

Unit supply officers and Division Quartermasters who are blessed with reserve stocks must use them to the utmost in helping along the distribution of fuel. Too often we see division, regimental, or separate battalion gasoline trucks parked under the trees "in reserve" and at the same time their smaller units forced laboriously to collect vehicle drums one by one and travel many miles to Army supply points for replenishment. This practice is not only an imposition on the troops but actually discourages the maintenance of satisfactory levels in vehicle reserves.

Though these functions of vehicle operators, unit supply officers, and commanders of all grades are essential, the chief burden of Class III Supply falls on the Army Quartermaster. It is he who must meet every demand of the troops, yet must plan his own replenishment with little help from a higher echelon. He is charged not only with the issue of motor fuels and lubricants in unit lots, but in order partially to protect himself against overwhelming demands, he must refill each and every individual vehicle that he can possibly reach.

He must be prepared to meet major emergency demands by actually moving depot reserves to the point of need. He must maintain sufficient records and data to permit intelligent planning for the fu-

ture and to prevent dangerous shortages.

Essentially, the maintenance of a satisfactory Class III Service depends on the intelligent cooperation of all echelons, from top to bottom.

Attack!

[From a radio talk to Red Army men by Lieutenant General V. I. Chuikov, famous among the defenders of Stalingrad as Commander of the 62d Soviet Army. Reprinted from *Information Bulletin*, Embassy of the U.S.S.R.]

LET YOUR attack be a headlong one. Get to the enemy in one leap. In open spaces where the enemy is target-firing, you must make short runs singly, jump up in a trice and forward like an arrow. It is important to give the Germans no time to take aim; run for two or three seconds and then drop like a stone to the ground. Crawl unnoticed from the spot where you dropped, to the side, and when you get to a suitable firing position, open fire immediately on the enemy. As you run, keep carefully to the rules of camouflage, make use of uneven ground, of hollows, vegetation, and shell holes. Good camouflage will save your life.

And what is more important, keep strictly to the direction indicated. If you find yourself under German artillery fire, do not lose your head. Take a headlong rush forward and you will be out of the firing zone. Then forward again against the enemy.

When advancing with tanks, keep directly behind the tank and do not get separated from it. As you run forward, fire on the enemy's antitank crew and wipe them out. Determinedly and simultaneously with your tanks, break into the enemy's positions and wipe him out with fire, bayonets, and grenades.

As you advance, you have the cover of your own artillery and mortar fire. Try to keep as close as possible behind the explosions of your own artillery shells. Your shells give you protection from the fire of the enemy. At such a moment the enemy's fire is ineffective. But if you fall behind your own artillery and mortar fire, you will only harm yourself.

The attack is the decisive moment in an engagement. Before the attack, load your weapons and get your ammunition together. With your grenades ready, burst headlong into the enemy's dugouts and trenches at the signal from your commander. Once inside, everything depends on your boldness, your skill, your cunning and initiative.

Break into the enemy trenches like this: first the grenades and yourself after them. Once in the enemy dugout or trench, you may meet with the unexpected.

The great thing here is not to lose your head. Each of you hurl your grenades and then go in; for each dugout, a grenade, then the automatic rifle, and then again forward.

The enemy may counterattack. Do not fear. Fight boldly. You have already won a success, and the enemy has lost his trenches. Get close to the counter-attacking enemy, strike with grenades, use your knife or spade.

The Germans will use tanks, but do not fear them. Don't try to run away; you won't get far. Get into a trench or shell hole, go for the tank with grenades and incendiary bottles, and smite the enemy infantry with rifle fire. Try to make the enemy infantry hug the ground, to cut them off from their tanks, then wipe them out. If the enemy tanks pass over your trench, there is still nothing to fear. Your artillery and antitank comrades will deal with them. Your business is to wipe out the infantry, and to press forward.

If the attack is not a success, do not feel bitter about it. Entrench yourself on the lines you have reached, and, at the signal from the unit commander, advance again. If you fail a second time to rout the enemy, there will be a third time, and a fourth, and any number of times, until you achieve your end.

In hand-to-hand fighting keep close together. Strike the enemy with rifle-butt, with bayonet, and with your whole heart. Do not think of yourself. Watch your comrades. Don't let them get hurt, and they will help you out. Always try not to give way or be beaten off. Hand-to-hand battles are won by those who strike desperately and boldly. Pursue the retreating enemy. Fire as you go. A fleeing enemy tires more quickly than you who are advancing.

Keep a constant eye on the field of action, on your neighbor, and on the sky. Report everything you observe immediately to your commander. If the commander is out of action, take your orders from whoever assumes command. If you feel strong enough, take the command yourself.

Spare no effort, but keep up the offensive.

Hints for Combat

LIEUTENANT COLONEL E. H. BURBA, *Field Artillery*

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IN LOOKING back on the Tunisian campaign one sees the completeness and soundness of training and tactical doctrines employed by our Field Artillery School. These things are essential because there is very little new technique learned by personnel under fire except methods of self-preservation. Training then must be complete, leaving only mechanical execution for the battlefield. Training also, insofar as possible, should be progressive so that the unit may be committed to action at the peak of its cycle much as a coach works his team up to the important game of the season. The intent of this article, then, is not to advance new ideas but to stress the importance of certain old ones.

Much has been said on the subject of leadership. No one denies the importance of this attribute so essential to an officer, yet too little is known of how to lead troops in combat. On one hand, young officers who are thrown into rather intimate contact with their men in the field permit the spirit of comradeship, which is the natural human reaction to sharing danger, to break down that reserve and self-reliance which must be retained. On the other hand, other officers in their consuming desire to do a good job resort to loud, bombastic, exaggerated phraseology which reduces the weight of subsequent orders and definitely induces a feeling of tension or excitement among subordinates. In combat the initial problem of the individual is to overcome his natural tendency to be excited in order that he may think and act most efficiently. Excitement transmitted by a strained or high-pitched voice is most contagious among troops. They may function in spite of it, but certainly not because of it. If an officer must change his normal manner in combat it should be to slow down in every way except mentally, and regardless of circumstances he must retain his self-composure. Patience and a good sense of humor are invaluable characteristics. An officer should push and drive his command, be it a platoon or regiment, throughout its precombat training, so that obedience and the proper performance of duties are instinctive. Prior to combat he must make himself known to his men as a person of inflexible will

who accepts no alibis and will be satisfied with nothing but results. Then, on the battlefield, the command will achieve results because it knows nothing else. Other suggestions for obtaining the confidence and maximum efficiency of troops are as follows:

1. Let it be thoroughly understood before your unit is committed that the slightest evidence of cowardice will be punished. See that the troops themselves attach a stigma to neurosis and weakness.
2. In your first action, commit your command under the best circumstances possible within the limits of your mission. Make no blunders, for a unit is profoundly affected by the success and confidence achieved in its first engagement.
3. Always know the tactical situation and keep subordinates informed. If you don't know it, find out immediately even if it involves personal reconnaissance. No American troops fear anything they know is coming, and if they know the mission of the unit they will accomplish it without you.
4. When not within range of small-arms fire, keep your men out of foxholes and busy. Under aerial attack and artillery fire, don't let your officers display fear by rushing to the deepest and best slit trench in the area.
5. Encourage humor when the situation is tough. It relieves tension and increases efficiency.
6. Never make important decisions based on reports received from an excited and exhausted man without verification of the facts. Often a cup of coffee will reduce the number of the enemy he saw by 99%.
7. When you visit front line troops, depart at the speed at which you approached the front.
8. Keep troops in combat either marching, fighting, eating, or sleeping. Arrange in advance for relief teams for functions normally carried on twenty-four hours a day regardless of tables of organization.
9. Instruct personnel in all possible uses of their principal weapon and develop their complete confidence in it. They must understand clearly that they will not leave, move, or destroy that weapon without orders, and the safest place to be in an attack is behind the gun and operating it.
10. Habitually site your CP no farther back than your reserve elements or rear battery. This facilitates communication, insures your knowledge of the situation, and inspires confidence among subordinates. Nothing is more disgusting than spending half a day traveling to and from a CP to receive orders.

11. By your actions, not words, impress your command with your desire to get the most of the best available for them. At the same time don't make a fool of yourself coddling them.

12. If you command a battalion, make your most promising young business man personnel officer and give him plenty of ration savings or other funds with which to buy on the local market. The arrival at the front of eggs, fresh fruits, vegetables, etc., does more for morale than a letter from home.

There is a tendency among some of our units not to employ all the supporting weapons available. I have seen an infantry regiment in the line with its 37-mm antitank guns sitting in a ravine 500 yards to the rear in march order and without gun crews. Even if loss of personnel requires that antitank gun crews be used as machine gunners, the guns can be placed in position on their MLR, dug in and available for use if needed. Also, in the case of the infantry regiment mentioned above, only half the mortars were set up and the assault guns were not being used. A German memorandum contained a severe reprimand of a unit commander by the division commander because records indicated his unit had fired only one-tenth of the ammunition available for his heavy weapons. Perhaps that is a good method of checking when personal inspections are impossible.

On another occasion a reconnaissance unit was assigned the mission of taking a mountain which rose abruptly out of a flat plain. The battalion commander asked for all the artillery support he could get, and while I was working out his fire plan with him I noticed he was bringing up every mortar, assault gun, and 37-mm he had. When the attack was launched everything he had opened up, and his troops pushed through to their objective without heavy loss.

On 24 March our forces were finally stopped, after a fifty-mile advance, by well-prepared defenses on the high ground east of Maknassey. A chief of section from an infantry cannon company came to my CP that morning with an urgent request for a forward observer to come and adjust fire on two guns that were being dug in near the crest of the hill. All of the observers were with the infantry; so I accompanied the sergeant in my radio jeep. Upon arrival at the position of the cannon company I saw no officers present. The sergeant pointed out the two German guns and I asked why he didn't knock them out with his self-propelled M3A1 75-mm howitzers. He said he had been using the howitzers, but their shells ricocheted off the front parapet of the partially dug pit. I then asked him why he didn't use a lower powder charge and drop the shells into the pit. He had never heard of that, nor had any of the other NCO's who gathered around. Serving the piece as gunner, I demonstrated the simple procedure. We

knocked out one gun with the sixth round after splitting a four-tenths mil bracket. I left them bracketing the other gun with charge two and using a gunner's quadrant for the first time in their lives. There were still no officers around. Those men were doing their best, but no one had instructed them in all the uses of their principal weapon.

In the initial stages of the campaign a little difficulty was experienced in getting infantry to jump off after an artillery preparation and follow its barrage closely. As they became more accustomed to it and saw the results of enemy machine gunners "coming to life" after the barrage passed, they followed at approximately two hundred yards. In one highly coordinated attack they stayed within fifty yards. A battalion of infantry had previously attacked "Question Mark Hill" across the valley from "Hill 609" in the sector east of Beja. The attack was unsuccessful. The next day, 1 May, an artillery forward observer occupied a large fox hole with the infantry battalion executive who had radio communication with the assault company commander. They were on the forward slope of a hill about two hundred yards from the company. The forward observer fired a short preparation with his battalion, starting near the top of "Question Mark Hill" and shortening range in fifty-yard bounds until the fire was falling on the forward German elements. The battalion executive then ordered the company to crawl up as close as possible to our fire. When they reported themselves in position the forward observer increased the range fifty yards and the company commander was told the next volley would be the last at the old range. When that volley hit he was to run into the smoke and dust and take cover in the shell holes. This was executed, and when the company commander again reported ready some five minutes later, the fire was lifted another fifty yards and the company plunged into the smoke and dust of the last volley at the old range. Enemy soldiers not injured by the fire were quickly handled in the bottom of their fox holes. This procedure was repeated until our troops were on top of the hill, and then our fire was kept on the other side until they reported they were dug in and organized. Only two men were slightly wounded in the entire operation, and when asked how he felt with our fire falling so close, a sergeant said, "Hell, sir, it felt kinda friendly!" Our troops are learning the accuracy of the old British axiom, "It is more economical to suffer one per cent casualties by following our artillery fire closely, than to lose ten per cent from enemy action."

Another use made of artillery by one infantry regiment was to mark with smoke certain hill tops to orient patrols which reported they were lost. This was easily done with map data, but to pick out one barley-covered hill from the others on the ground was almost impossible. Artillery was also used to mark a terrain feature in enemy territory with

smoke in order that Allied dive bombers could orient themselves immediately.

Never depend entirely on other units for local security; and always, regardless of how little sleep you've had, hold a morning "stand-to" thirty minutes before daylight, in which every man is inspected by an officer to see that he is alert and has his arms in his possession.

On the night of 16 February, near Sbeitla, an artillery battery commander posted the usual outpost guard even though his battery was 3,000 yards back of the front line. At 2100 hours a report of heavy firing at the front and the withdrawal of several friendly units was made to the battery CP. At 0100 hours a patrol walked into a German Mark III tank. He quickly found a slit trench and opened fire with tracer ammunition from a tommy gun. When the tank returned the fire, the soldier dropped into the trench; and the battery opened fire on the tank. Other German tanks opened fire and disclosed their positions. The attack was repulsed and three tanks knocked out because they were discovered in time.

On 20 February in Kasserine Valley a battery went into position in the evening; and since they were some distance behind the line and hadn't had any sleep for two days, a small guard was posted rather close in. No "stand-to" was held, and the battery was awakened at daylight by battle cries of an infantry battalion which had infiltrated back to their position. All the guns and about half the personnel were captured.

Radio security is a most important subject. The German intercept service is well organized and passes information to line troops very rapidly. When no useful information can be gained from an AM [amplitude-modulation] net, they frequently jam it with a mechanical three-tone transmitter. I have never seen or heard of their jamming an FM [frequency-modulation] net, but I have seen the results of interceptions on that net. Apparently the German artillery was monitoring an artillery battalion fire-direction net with a captured radio. An excited battery officer reported, "A shell just burst four hundred yards in front of this position. Request permission to displace." Before displacement could be started the accurate sensing was applied by the German bat-

tery and upon intercepting the next message, "That one was right in the position," they fired for effect. Likewise, the transmission of adjusted data in the clear is bad practice because the Germans will go to the trouble to plot your position; and their map data corrected is not bad. There was rather convincing evidence of their locating a CP in one stabilized sector by the operation of an AM radio position-finding station. However, this was not common and can be expected only when a set transmits from one location for several days.

The aid CP (L-5 airplane) was found to be indispensable, but not exactly in the way it was anticipated. In the first place, the situation never occurred when the approximate location of the target was known in order that the guns could be laid before the plane took off. In every case of accurate location of a target, the man who located it adjusted the fire at the time and on the spot where he located it. By radio and telephone relays, even reconnaissance platoon commanders and tank and infantry officers conducted fire more effectively than by trying to locate the target and make an adjustment from the air OP. Ground observation is definitely better for two reasons: (1) you can approach the target more closely; (2) you can use glasses or a spotting scope in a stable position. However, we were able to keep a plane in the air long enough to pick up muzzle flashes, especially early in the morning and at dusk, and then make an adjustment. We never lost a plane due to enemy action, and that included flights from 31 January to 3 February at Station de Sened when enemy planes were overhead approximately twenty minutes out of every daylight hour. It was found after a few weeks use that enemy batteries would usually cease firing when the L-5 appeared in the air, and it therefore became a passive counter-battery measure. Other very important uses for this plane are reconnaissance and security, particularly in fluid situations when you know there is either enemy or nothing on the other side of the hills on your flanks. An L-5 well piloted can hardly be shot down by fighters because of its maneuverability and ability to land quickly. The only chance a fighter has is on his first "pass," and by taking evasive action just before he comes within range the L-5 pilot can avoid the fighter. The plane, of course, might be destroyed on the ground; but this never occurred to my knowledge in Tunisia.

I have made this letter rather long only because I have not had time to make it shorter.

—Pascal in *Lettres Provinciales*, 1656.

The Role of the Commander in Battle

[Translated from Polish at the Command and General Staff School, from an article in *Bellona*, monthly military magazine published in London, England, by the General Headquarters of the Commander in Chief of the Polish Army.]

IT IS superfluous to justify the existence of the commander. Suffice it to affirm the fact that every unit must have a commander who executes the orders which he receives from his superior. The unit which the commander leads is the instrument whereby the orders are executed. The commander directs action, and he alone bears and will continue to bear the responsibility for battle whether won or lost. Of course, while speaking about the commander, it is not the intention to minimize the importance of the unit he leads. The efficiency of the unit will largely determine the degree of precision with which the commander's order will be executed. Thus the unit as a whole will share both in victory and in defeat.

By examples which the author has either personally experienced or which he knows thoroughly from reports of the participants, the effort will be made here to show the commander's role in battle.

Before launching the subject of this article it is difficult for the author to omit some mention of the role and mission of the commander during the period of preparing an army for combat. This period will be called the preparatory period. During this period commanders of all ranks must be at once educators and military instructors.

What the significance of education is and what a role it plays is known to every one only too well. In support of the importance of education an opinion is quoted, expressed during World War I by two leaders of two hostile armies—Marshals Pétain and Hindenburg. Both these leaders said: "The best weapons, the finest machine guns will be of no avail if these weapons, these machine guns, are not being handled by soldiers with a will to fight." In this one phrase, "will to fight," is contained the complete meaning of education. And what a tremendous role is played by a will to fight is amply shown to us by historical examples symbolized by the magnificent sacrifice at Thermopylae. These examples are so far back in the past that it is likely that any heroism of our days will not suffer by paying homage to history.

Training is parallel in importance to education. The purpose of training is to teach the soldier how to fight. It is believed that on this score no justifications or examples are necessary.

Thus, if during the preparatory period commanders will succeed in so educating the soldier as to make him willing to fight and will train him so that he will know how to fight, they will fully discharge the first

part of the duty with which all commanders are charged. It is not the purpose of this modest work to discuss the question of how to educate the soldier and how to train him for combat. Only this can be added, that the following general principle shall be incumbent upon the commander:

Relative to education—the commander must be the embodiment of patriotism, sacrifice, and unquestioned devotion to duty;

Relative to training—the commander, above all else, must possess the complete mastery of all that he knows and all he wants to impart to his men.

Let us now pass to the proper subject of this study. Because it is the purpose here to discuss the role of the commander in battle, an attempt will be made for the sake of clarification of the question to determine precisely what battle is. Battle is the collision of two wills each of which strives to break the will of its adversary through the destruction of his power and means of combat. Hence the conclusion that every commander must be endowed with an unbreakable will and the ability to impose it on the enemy. This means that the commander must know how to force the enemy to accept battle in time and space most favorable to himself, or—speaking in purely military language—to assure for himself complete freedom of action while denying the same to the enemy in the maximum degree.

Preservation of the freedom of action depends on many factors which differ with the extent of the command involved. Thus:

(a) In actions operational in scope, these factors are: speed of concentration of large units in a given area; concentration of the bulk of friendly forces in a manner endangering the enemy flank, thereby placing in jeopardy the enemy lines of communications; assuring for himself the possession of the necessary means in good time and in proper quantity.

(b) In actions tactical in scope, these factors are: preservation of the bulk of one's own forces in readiness for the decisive blow and in the direction of one's own selection; attainment of the element of surprise in executing the decisive blow; possession of fire superiority at the spot of the decisive blow.

(c) Finally, in action of the scope of the smallest independent tactical unit, i.e., in so-called small-unit tactics, these factors are: the capture of important terrain features; readiness to commit to battle all

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the fire elements, thus gaining fire superiority from the very beginning of the engagement.

In summing up the above it is emphasized that the first characteristic quality of every commander should be a never-swerving effort to assure for himself *freedom of action* which, simultaneously, is the fundamental prerequisite for the imposition of his own will on the enemy.

Example.—Possession of freedom of action is illustrated by an example of an operational scope from the Polish-Russian war of 1920. It is the so-called Battle of Warsaw. In this case the Poles made use of their superiority on the flank. Emboldened by many successes, the Russian northern army was driving forward. Its main forces were storming Warsaw, while its northern wing reached as far as Torun. Between this and the southern Russian army, engaged in the general direction of Lwow, a gap was formed. This situation was exploited by Marshal Pilsudski. He concentrated an assault army on the Wieprz river and with this army struck the flank and rear of the enemy committed in the battle of Warsaw, which action decided the Polish victory.

The second characteristic quality of every commander is: the ability to make a *quick and correct* decision.

In this connection it should be mentioned that a weak decision, made and executed in good time, is better than the finest decision which is too late. In speaking of the decision let us recall of what elements it consists. As we know, the decision is the analysis of and the conclusion arising from enemy and own situation, mission, terrain, and time.

The sum of the conclusions drawn from the analysis of these four factors almost provides us with the ready-made decision. The word "almost" is used because in battle it is impossible to foresee all the surprises, especially the psychological ones, on the enemy's as well as one's own side.

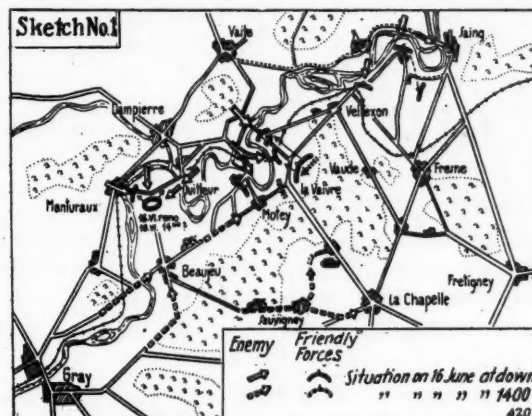
Such an analysis and conclusions drawn from it is a question which belongs to the training of the commanders during the preparatory period. During combat this involves quick orientation, temperament, instinct, as well as so-called talent or soldier's luck.

Example (see sketch No. 1).—1. General situation—an infantry division is preparing for defensive action in the region of Belfort. According to information received enemy motorized detachments are active from the northwest, from the general direction of Neufchateau.

On 14 June 1940 at night, the 2d Battalion of the 5th Infantry Regiment (motorized) which is in the vicinity of Belfort receives the order to close up the crossings over the Saone river in the sector shown by the sketch. In the south, the junction Gray-sur-Saone is occupied by a battalion of allied troops. In the north, the crossings on the Saone (Saing and

to the north) are defended by elements of the same division. The 2d Battalion of the 5th Infantry Regiment (motorized) was transported to the Saone river at noon on 15 June 1940 in trucks.

There are seven bridges in the battalion sector, including one railroad bridge; the disposition of the



battalion is shown on the sketch. On 16 June 1940 at dawn, a company of R. 35 tanks is placed at the disposal of the battalion commander.

2. Course of action.—From the moment of the battalion's arrival at the Saone river, swarms of refugees and straggling army units crowd across all the bridges in southeastern direction. They bring fantastic news of the enemy who allegedly is advancing close on their heels.

On 16 June at dawn, contact with the enemy is established at all the crossings by forces engaged in the latter's defense. Enemy pressure is becoming particularly heavy on the left flank and in the center.

Initial enemy reconnaissance activities are followed by organized attempts to force the several crossings with the aid of about thirty dive bombers.

At about 1000 the commander of the left-flank company reports that the enemy has forced a crossing at Quitteur. As the result of this report the battalion commander decides to repulse the enemy who accomplished the crossing. For this action he designates from his reserve three tanks and an infantry platoon with a machine gun squad. At the very moment (1100) that this detachment starts from La Vaivre in the direction of Motey, an enemy armored column appears at the edge of the latter place. The detachment strikes immediately, destroying several German tanks and stopping further enemy advance. The reconnaissance which was sent out reports that the German armored column fills the entire road from Motey to Beaujeu, thereby cutting off the left-flank company. As the engagement mentioned above begins there arrives at the battalion commander's OP an officer from the French headquarters in command of the defense of the Saone. This officer delivers a verbal order which is essentially as follows: "Immediate retreat from the Saone river. Neighbor on the left flank, i.e. in the south, withdrew during the

night of 15 June. Besançon (about 40 kilometers to the southeast) captured by the enemy. Situation of Vesoul uncertain." Asked as to the direction of withdrawal the officer points on the map in general north-eastern direction.

In the meanwhile the tempo of the battle grows. Runners sent to the left-flank company return with the report that they are unable to break through the enemy armored column which blocks the road everywhere. A second report states that enemy tanks made appearance also in the region of La Chapelle in the rear of the battalion.

The general situation at 1400 is as follows:

1. the battalion is committed against the enemy in the entire sector (23 kilometers); the reserve, less a few tanks, is engaged near Motey;
2. the left-flank column is cut off, efforts to establish liaison with it are without result;
3. the enemy is reaching the rear of the battalion in the region of La Chapelle;
4. there is no telephone or radio communication;
5. there are no vehicles for the equipment;
6. the enemy is in the deep rear (Besançon is captured, Vesoul is uncertain);
7. the direction of withdrawal is, to all intents, unknown. In this situation the battalion commander makes the following decision:
 - a. attack the enemy at Motey, following which gradually break off combat starting with the left flank;
 - b. assemble the battalion in the forest in the region of Vaude;
 - c. under the cover of darkness and the protection of the forest, proceed, according to the developing situation, in a general northeasterly direction.

Orders are issued. The hour for disengagement between 1630 and 1715.

At 1400 the battalion reserve strikes in the direction of Motey. The enemy is thrown back and is passive. In accordance with the order the companies withdraw gradually from the crossings under enemy fire. At about 2000 the bulk of the battalion, less the left-flank company, assembles at Vaude.

In the afternoon of 18 June, after having marched 149 kilometers, the battalion rejoins own division in the region of Maiche.

The third characteristic quality of the commander is the *sense of responsibility* for the mission entrusted to him.

In the execution of a mission we always encounter very many obstacles of which the most difficult and important is the enemy's will, already mentioned.

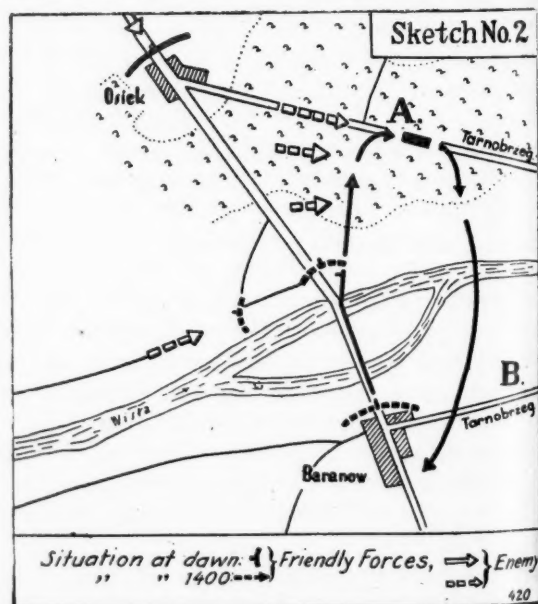
Besides this fundamental obstacle we always meet with many other obstacles, for instance: terrain which in many instances facilitates, but which also

may render difficult, the execution of the mission; hour of day and season; time (this may be very short); material shortages (anticipated means of combat may not arrive); finally, surprises arising either from enemy actions, or those from own actions, which can never be anticipated.

To break down and to overcome all these difficulties standing between the commander and the execution of the mission entrusted to him, is the cardinal duty of every commander.

Along with this goes the responsibility for bringing the soldier into the battle in the finest condition, both in physique and in morale. This involves the entire program of care of the soldier's welfare beginning with his feet and including mail service in the field. Besides this responsibility there is one more which, perhaps, is equally as important or even more so: the responsibility for the preparation and possession of the means of combat. This responsibility differs with the degree (size) of command. In the highest command the responsibility is borne for the entire equipment of an army, while in the lowest command it will involve such matters as supply of antitank ammunition or signal rockets.

Example (see sketch No. 2).—1. General Situation: The 75th Infantry Regiment since dawn 16 September 1939 has been covering the crossing of the Vistula (Wisla) river at Baranow in the Osiek region. After accomplishing this mission near noon, elements of the regiment complete their own crossing of the river while maintaining contact with the enemy. The regimental commander discovers that a part of the regiment, in withdrawing from Osiek,



proceeded on the road to Tarnobrzeg instead of to Baranow. In this connection, the regimental commander at about 1300 gives the following order to the reconnaissance company of the regiment: "Situation: (Known). Send patrol in the strength of one

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platoon, led by an officer, which is to establish liaison with units which erroneously took the road to Tarnobrzeg. The patrol will direct these units to proceed via fords across the Vistula (Wisla) in the direction of the regiment; march, i.e. Baranow—B. Start immediately, return with units mentioned above."

Because of the importance of the mission the commander of the reconnaissance company requests permission to lead the patrol personally. The regimental commander grants it.

Course of action: The patrol leaves Baranow at 1330. It crosses the bridges across the Vistula (Wisla) at the precise moment when the rear guard begins to retire under enemy pressure. In spite of heavy fire the patrol succeeds in crossing the line and reaching the woods. Here the patrol encounters strong enemy units and suffers considerable losses: of 15 men, only the commander and 2 men remain, the others perish.

With no regard for the losses, the patrol commander continues the mission and at about 1500, in the vicinity of "A," he finds a group of the trains and loose elements of the regiment which, in line with the regimental commander's order, he leads in the proper direction. Together with these elements the patrol commander rejoins the regiment at about 1700.

The fourth characteristic quality of the commander is *the ability to exert his will on the course of the battle*. What does this mean?

Just as in every game—and combat is the most magnificent of games, played with maximum of resolution—it is essential to hold the trump cards until the course of the game becomes entirely clear. In our game these trump cards are: divisions, regiments, battalions, platoons, groups of aircraft, guns, heavy machine guns, bayonets, tanks, etc.

Under special conditions of combat these trump cards will be food, fuel supply for tanks, and the like.

The commander who is left with nothing which at the critical point could sway the battle in his favor actually gives up his leadership and becomes the passive witness of a struggle or, if endowed with character and temperament, he takes a rifle and personally participates in the battle as a last reserve to perish heroically but how often also unnecessarily.

Of course it is difficult to provide a formula as to where and how to maintain a reserve. In any event one must always remember the fundamental principle of making use of one's last trumps, i.e. selection of the direction of the blow, and selection of the time for the blow.

Both these factors, time and direction, are parts of decision already discussed. Here there should be stressed the matter of instinct or talent, as taken

apart from the so-called academic route of reaching a decision.

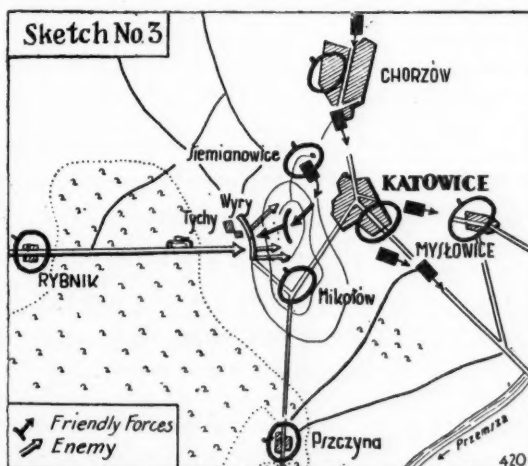
The fifth characteristic quality of the commander is *initiative*.

Modern battle which we are witnessing, known as "lightning war," in which the dominating part is played by the machine, frequently places us in the position where time is the deciding factor. In former wars, even in that of 1914-18, in which, in principle, space was covered by the "doughboy's" legs, commanders had much time for making the decision. Today, when vehicles swallow space, the commander must appraise and decide with equal speed. In the face of events developing with lightning speed, very frequently orders do not arrive in time, which places the lower commander in the position of being unable to wait. He must then act independently.

To obey orders does not mean to wait for them; it means to anticipate them in accordance with the desire or intention of the higher commander. In other words, in every situation initiative must be shown.

Initiative must be stressed all the more because the battle itself often develops a number of situations the advantage from which must be immediately exploited. There is not time for reports and for waiting for the higher commander's order, moreover, because in many instances the higher commander, not being present on the spot, cannot sense the situation as presented in a terse report.

Of course in speaking of initiative and in stressing its importance, care must be taken not to interpret this as meaning that it must be exercised at will in every combat situation, for then the direction of the battle would escape the hands of the responsible commander. Once again it is emphasized that to show initiative is to anticipate the higher commander's orders. In this connection, every com-



mander must know his higher commander's intentions so that in using his own initiative he will be

able to act in accordance with the higher commander's general decision.

Example (see sketch No. 3).—General Situation: The 23d Infantry Division is in course of mobilization on 1 September 1939. It engages the enemy about 2 to 3 kilometers from the Polish-German frontier. Following flank attacks from the north and the south by enemy armored columns the division receives on 2 September 1939 the order to retire to the eastern bank of the Przemsza river.

The initial disposition of the division is shown on sketch.

On 2 September 1939 at 1000 the commander of the 3d Battalion, 75th Infantry Regiment, begins to march in the direction ordered. Simultaneously the battalion commander receives a report from a guerrilla unit in Wry that this place is under a heavy attack by enemy infantry and tanks.

The battalion commander decides to change the mission assigned to him and with his unit he proceeds to Wry where he arrives just as the enemy is pressing friendly forces out of that place. He strikes immediately, recaptures Wry and holds the place until all the elements of 23d Infantry Division safely pass through the junction at Katowice, i.e. until dusk 2 September. The battalion commander reported to the division commander about this change, and the latter approved it.

Thanks to the initiative of the commander of the 3d Battalion, 75th Infantry Regiment, the bulk of the 23d Infantry Division was able undisturbed to reach the designated position on the Przemsza river.

The sixth characteristic quality of the commander is *his character*.

This problem probably is at once the easiest and the most difficult to explain. It is the easiest because the conception of a man endowed with so-called character is well known from every-day life. At the

same time the problem of the commander's character in combat is very difficult to explain because combat creates many psychological situations, brings up many irrational factors, and exerts such an influence on the man, both as commander and as a human being, that at times the surest estimates come to naught. Generally it is possible to ascertain that the commander endowed with character is one who with perseverance, complete personal sacrifice, and devotion will break through all obstacles standing between him and his goal, without regard for any consequences. (Example: Award of the Order of Maria Teresa in the Austrian Army for non-execution of an order.)

When speaking of this problem, which probably involves the most interesting and the most important characteristic of the commander, it is possible to risk the assertion, that a commander with lesser ability and greater character is better than one in whom these qualities are reversed.

Of course, the ideal commander will be the one in whom all the above mentioned qualities, plus character, will be combined. Such commanders emerge as leaders in time of war. Character is a question of moral values concealed within the man, which can manifest and develop themselves only in an emotional situation such as only combat can create.

As an example of the commander's character there can be quoted the famous defense of Westerplatte [in Danzig] in the Polish-German War, 1939.

A small force of soldiers was assigned the hopeless task of defending several hundred meters of Polish soil, everywhere surrounded by enemy territory.

This task was fulfilled with a character and will so great that even the enemy had to recognize these qualities. In recognition of the heroism of the defense of Westerplatte the captors symbolically left the Polish commander his sword.

When the Emperor ordered a review for noon, the generals passed the inspection at eleven o'clock, the colonels had their regiments take up arms at ten. Before that the chiefs of battalion wanted to make sure that all was well, and began at nine o'clock: and so on in decreasing proportion, to the corporal who had his squad up at five in the morning. All these successive taking up of arms tire the French soldier more than a day of combat.

—Captain Elzéar Blaze in *Recollections of an Officer of Napoleon's Army*.

The Division G-1

MAJOR WALTER R. KREINHEDER, *Coast Artillery Corps*
Instructor, Command and General Staff School

G-1 IS A General Staff officer. As such he does not command. He is responsible for the personnel matters of the division (or higher unit) and his specific duties are tabulated in paragraph 14, Field Manual 101-5 (Staff Officers' Field Manual). Like other General Staff officers he plans, and coordinates his plans, with the General and Special Staff sections. He is neither an operating agency nor a desk soldier, but rather a planning, organizing, and supervising executive.

From the initial meeting of the division General and Special Staff sections onward, G-1 builds a policy folder; a brief compilation of the guiding plans, principles, and decisions approved by the Commanding General. This policy folder usually includes brief notes on such subjects as filler and loss replacements, classification, reception, assignment, pay, promotion, separation, welfare, and morale. G-1 is never a slave to the paper work involved. He supervises the assignment of tasks to the operating agencies and checks results.

Once policies have been approved by the commander and announced to the command, G-1 supervises, by means of helpful visits and inspections, the work of the personnel charged with putting the policies into effect. Combat efficiency is always the goal of all echelons. Paper work must be kept to a minimum.

Combat preparations require that G-1 insure the proper classification or reclassification of all individuals; the clearing from the division of all non-effectives; the requisitioning of replacements; the recommending of promotions incident to such clearance; and the building of a morale peculiar to the battles to come in overseas theaters of operation.

A battlefield morale rather than a garrison morale must be inculcated in the command. A confidence borne of demonstrated leadership, a proficiency in arms, fire, and equipment, and a psychological aggressiveness are the results desired by the General and Special Staff working in close unity. It is incumbent upon G-1 to deliver to the port of embarkation a division having each man and officer physically fit and eager for battle.

This article deals primarily with G-1's activities in a Theater of Operations. It is intended to serve as a guide for his training and activities in the United States where his division's training is all pointed toward combat effectiveness overseas.

G-1 ACTIVITIES IN THE COMBAT AREA

This section deals with G-1's functions in the combat area including the approach march and battle. It is assumed that all individual and unit training, field exercises and maneuvers, have been completed and that the division is prepared for combat. G-1 is now prepared to undertake his new responsibilities incident to the transfer of the division to an overseas combat area. Henceforth G-1 must be able to solve the additional problems arising with battle.

Activities During Approach March.—G-1 is charged with the preparation of plans for the control of civilians and refugees. Civilians in the combat zone must be rigidly controlled by the division to provide security and prevent interference with troop movements and tactical operations. Division control of civilians, including the first phase of military government or martial law, is often part of the tactical plan. Such control should be limited to the actual requirements of the tactical situation. Plans should be simple and sufficiently flexible to meet changing conditions as they develop. Full use should be made of existing civilian authorities and of military personnel in higher echelons (e.g., corps or army military police and civil affairs sections).

The first step in the control of civilians in newly occupied areas, is immobilization, commonly called "freezing." When leading combat elements enter an area, they usually drive all persons indoors into homes or buildings, there to await further instructions. G-1 develops this control plan. The Provost Marshal with his military police executes the plans.

The decision to evacuate civilians is the responsibility of the military commander. This decision is based on the tactical situation and is usually made by headquarters higher than the division, unless the division is operating alone. Evacuation must be planned well in advance, especially in friendly territory. The enemy may drive friendly civilians into our zone of operation by aerial bombardment and machine-gun fire, hoping to interfere with our movements by congesting roads and critical points.

Civil police, defense auxiliaries, and other agencies may be employed under military police direction. G-1 should coordinate the employment of all civil authorities in order to prevent panic, uncertainty, or confusion. G-1 in any event must be ready to offer an evacuation plan, prepared either independently or in coordination with other echelons. He may use the following checks:

- a. Divide zone into definite areas:
 1. To be evacuated.
 2. To receive evacuees.
- b. Register people to be moved.
- c. Assign evacuees to reception areas.
- d. Check adequacy of reception areas.
- e. Specify routes, and when they may be used.
- f. Provide traffic control.
- g. Provide for feeding, health, sanitation, and shelter.
- h. Specify baggage and personal belongings to be moved.
- i. Check availability and efficiency of civilian organization and of its control personnel.
- j. Maintain flexibility of plans.
- k. Control all movement by military police.

(References: FM 100-10, Chap. 8, Sec. VII; Civilians in Theater of Operations. FM 100-15, Chap. 9; Civilian and Evacuation Traffic.)

Activities During Contact With the Enemy.—The transition of the division from the approach march to developing contact with the enemy is a continuous situation. However, it offers G-1 an opportunity to make plans which will be of maximum value during actual combat. The tactical situation has cleared sufficiently at this stage to permit of general administrative plans which can be translated into orders promptly, plans which will support the tactical plan of the division commander. This phase of operations bridges the gap between no hostile contact and actual battle from both the tactical and administrative viewpoint. Accordingly, G-1 is now making every preparation for matters of his responsibility which will be realized henceforth, including the battle period itself.

Administrative Plans and Orders.—G-1 prepares for the Chief of Staff's approval, plans covering phases of administration which relate to personnel. Such plans include appropriate paragraphs for the formal Administrative Order, including the following:

G-1 PARAGRAPHS OF ADMINISTRATIVE ORDER
(See FM 101-5, Form No. 6, p. 98)

- | <i>Administrative Order Par. Nos.</i> | <i>Subject (See discussion below)</i> |
|---------------------------------------|---|
| 2b. | Burial (instructions and locations of cemeteries). |
| 2e. | Prisoners of War (location of collecting points and enclosures, and responsibility for evacuation). |
| 5a. | Stragglers (location of straggler line and straggler collecting points). |
| 5c. | Mail (collection and distribution). |
| 5d. | Shelter (assignment and quartering parties). |
| 5e. | Strength Reports (time of preparation and submission). |
| 5f. | Replacements (time for submission of requisitions and assignment—time, place, and number per unit). |

Fragmentary written and oral orders may be used prior to issuance of the complete Administrative Order. All must be complete, clear, and concise.

2b. Burial.—G-1 provides the plan and supervises burials and grave registrations for the division. All

burials should be prompt; in suitable manner; identity preserved by complete grave registration; labor and transport from division Quartermaster (labor battalions, civilians, or prisoners of war) rather than combat troops. Chaplain used for supervision in absence of graves registration units. Coordinate with G-3 when combat troops used; with G-4 for quartermaster control. Careful search of battlefield essential. (Reference: TM 10-630, Graves Registration; AR 30-1800.)

2e. Prisoners of War.—Provost Marshal is operating agency. Capturing units hold prisoners for hasty search and questioning only; deliver to Division Prisoner of War Collecting Point(s). Close cooperation between Provost Marshal and G-2. Segregate officers, non-coms, and privates at once. Characteristics of Prisoner of War Collecting Point; on or near straggler line but away from straggler collecting point; cover, water, shelter desirable; location to facilitate evacuation; convenient for G-2 examiners. Advance Prisoner of War Collecting Point(s) established in certain situations, i.e., river crossings, etc. Evacuation normal by army or corps—keep them informed of Prisoner of War Collecting Point location. Prisoners of war may be retained by division temporarily for labor—burials, road repairs, etc. Not processed by division, tagged only (PW tag, WD PMG Form No. 1). (References: FM 29-5, Chap. 7; Prisoners of War. FM 30-15: Examination of Enemy Personnel.)

5a. Stragglers.—Provost Marshal is operating agency. Control stragglers.

1. In bivouac by interior guards plus traffic MP's. After troops depart MP's comb area.
2. On march by MP patrols following the column(s).
3. In assembly areas by straggler posts or straggler lines.
4. In combat by straggler line.
5. In rear areas by motorized MP patrols.

Straggler lines usually located along road to permit patrol by motorized MP's, otherwise along easily identified terrain feature. Runs generally parallel to front and just in rear of division artillery positions; coordinate with lines of adjacent divisions. Cover thoroughly natural lines of drift. (Reference: FM 29-5, Par. 29: Stragglers.)

5c. Mail.—This matter is high on G-1's list of duties because of its vital influence on morale. Arrange through Postal Officer for delivery, suspension, facilities for out-going services, personnel for distribution and processing, and censorship. The Commanding General, through G-1 (Adjutant General and Division Postal Officer) is responsible for the mail service within the division including the Army Post Office (WD Cir. No. 399, 1942). (References: FM 100-10, Chap. 10, Sec. III: Army Postal Service. TM 12-275: Regimental and Unit Mail Clerks.)

5d. Shelter.—If not prescribed by higher headquarters, G-3 will normally recommend general areas for camps, bivouacs, and billets. G-4 arranges procurement, rental, and owners' permission, when necessary. G-1 makes allotment of areas, after thorough advance reconnaissance when possible, to units in accordance with the tactical plan including probable direction of next movement, order of unit departures, groupings (i.e., combat teams, etc.) Keep units close to their supply or service installations or near their zone of operations.

It is desirable to have an advance party, including regimental and separate battalion representatives, make preliminary reconnaissance with representatives of the Surgeon, Engineer, G-4, Headquarters Commandant, and the Signal Officer, to post guides (one enlisted man from each company), prepare maps, mark routes, and organize military police for traffic and to supplement guides.

When billeting, check the following items: (1) requirements of each unit; (2) plans for assignment; (3) G-4 regarding procurement, rental, etc.; (4) G-3 concerning tactical considerations; (5) consult Special Staff Officers concerned; (6) reconnaissance with advance party; (7) general plan to Chief of Staff; (8) assignments to unit representatives and guides; (9) sanitation, law and order, and security measures. (References: FM 101-10, Chap. 9: Camps and Bivouacs. FM 100-10, Sec. VI, Pars. 509-519.)

5e. Strength Reports and Graphs.—Strength and casualty reports must be used in combat to keep the commander informed as to the fighting effectiveness of all units. The Adjutant General and other Special Staff sections maintain such records as part of their normal functions. G-1 interprets the records in keeping the commander informed and in making constructive recommendations. He should summarize the records in chart or graph form for maximum convenience and clarity. Other items desired by the Commander in Chief or the Chief of Staff may include G-1 estimates of losses, etc. A separate report may show courts-martial, AWOL, desertions, venereals, etc.

5f. Replacements.—The goal of the division replacement plan is to maintain the division at full strength, emphasizing immediate and complete flow of replacements. For maximum benefits from training, units must be at full strength when in rest, reserve, rehabilitation, or training areas. It is generally undesirable to receive replacements during actual combat, but military expediency may require that this be done, especially when combat is prolonged. Division requisitions for replacements are submitted to meet *actual* losses. Divisions do *not* requisition replacements for anticipated losses. (References: FM 100-10, FSR-Adm, Change No. 1, April 29, 1942, Chap. 8, Sec. II. MR 1-11, Sec. V. FM 101-10, SOFM, Chap. 4, Sec. II.)

Activities During Combat.—The preceding paragraphs have discussed matters which G-1 deals with prior to actual battle. These activities, generally initiated during the approach march and prior to combat, are not then complete and forgotten but are a continuing operation requiring persistent supervision, adjustment, and change to conform to the changes in the actual combat itself.

It has been said that the beginning of combat marks the end of G-1's duties. This is far from true. Only about 5% of a division's time is spent in battle; the remaining 95% of the time is required for rehabilitation, replacement, and new training. It is apparent that G-1 needs initiative and imagination so as to visualize well in advance and accomplish the many problems falling within his sphere of influence and responsibility. His activities require longer to complete than do those of the other General Staff sections.

At no time can G-1 consider his duties or responsibilities temporarily in abeyance. When the division is in actual combat, he begins planning for the after-battle phase when it will be resting temporarily or undergoing rehabilitation. Subjects such as leaves of absence, furloughs, and replacements receive preliminary study even though G-1 is still actively occupied with moving the command post, handling stragglers and prisoners of war, or implementing a program of decorations, citations, and awards, which program is used both during battle and in rehabilitation periods. Often, therefore, at periods of greatest battle activity G-1 must begin plans for the tasks to come, i.e., restoration of the division to full strength, regaining battlefield morale, reconditioning the individuals, etc. These rehabilitation and reconditioning activities are treated briefly in the section which follows.

REHABILITATION OF THE DIVISION

The division has now been withdrawn from battle and G-1 proceeds with the manifold duties incumbent upon him of administration and personnel requirements. His foremost concern is the re-establishment of battlefield morale through reconditioning the individual by rest, baths, recreation, pay, leaves and furloughs, promotion, decorations and citations, and general welfare activities. After initiation of such a program he turns to matters of administration including requisitions for replacements, promotions, efficiency reports, transfers, reclassification, retirement and discharge, and courts-martial. Only when these and other matters have been completely and successfully accomplished can G-1 report the division rehabilitated and at maximum battle effectiveness.

Rest Areas.—The importance of gaining from rest periods every possible advantage for the personnel of the division places the organization and operation of rest areas in high priority on G-1's list of

activities at this time. Upon receipt of orders relieving the division from combat and ordering it to a rest area a warning order should be issued to the command. Immediately the following matters concerning the organization of the rest area must be accomplished:

1. Arrange for quartering party, advance detail and reconnaissance.
2. Announce policy of leaves and furloughs.
3. Bath and laundry units to be available.
4. Personal equipment stored in barracks bags, etc., during combat to be promptly made available to owners.
5. Full postal facilities.
6. Pay brought up to date.
7. Entertainment, recreation, and athletics to be made available.
8. Post Exchange facilities.
9. Religious and welfare activities provided.

Reconditioning the Individual.—Matters affecting the mental and physical well-being of the individual require G-1's constant supervision at this time. These activities and facilities should include:—

1. Baths, laundry, and change of clothing.
2. Recreation and special services.
3. Religious and welfare activities (Ref: AR 60-5; FM 101-5, par. 34).
4. Pay.
5. Leaves and furloughs (Ref: MR 1-10, par. 13; FM 100-10, Chap 8, Sec VI; AR 605-115; AR 615-275).
6. Efficiency reports (Ref: AR 600-185; AR 605-90).
7. Reclassification, retirement, and discharge (Ref: AR 605-230: Reclassification; AR 615-360: Enlisted Men; Discharges, Release from Active Duty. WD Cir No. 358, 28 Oct 42; WD Cir No. 359, 5 Dec 42.)
8. Courts-Martial (Ref: Manual for Courts Martial).

THE RECURRING CYCLE

Accordingly, when the activities outlined in the preceding section have been satisfactorily accomplished, the ever-recurring cycle of Combat—Rehabilitation—Combat is realized. Older members of the command have had their *esprit* rebuilt through many measures, especially from witnessing the re-

turn to units of restored hospital casualties. These returning casualties contribute much more than usual loss-replacement manpower; they bring to all members of the division a symbol of hope and confidence, and a quiet enthusiasm for personal valor. New replacements have been indoctrinated with the battle tradition of the division. The officer leadership in training, the camaraderie with the veteran members, and the impressiveness of ceremonies upon presentation of decorations and awards, all combine to weld single and separate individuals and units into an effective, homogeneous whole.

Technique is covered in the various War Department FM's, TM's and MR's. Members of the Special Staff and the operating agencies have been trained as specialists to perform certain duties. G-1's supervision and organization of these specialties requires a knowledge of their capabilities and limitations in order that they may be made to contribute their full share to the G-1 programs. The technical procedure is manifestly the sphere of the Special Staff and subordinate units, and G-1 does well to look to them accordingly.

It is essential that G-1 take the "Command" viewpoint. In that manner can he best appreciate what the division commander would want accomplished. Accordingly, G-1 can then approach his various problems with logic, and coordinate the work of the operating agencies via "Command" direction of "what—where—when—why" but not *how*. The *how* is the technique of the assisting agencies, with which G-1 does not become involved. So we see the Surgeon being asked for recommendations and drafting the Division Sanitation order; the Headquarters Commandant actually moving the command post; the Signal Officer advising on the command post location, etc. As the General Staff are expert advisers to the division commander so also should the Special Staff and operating units be expert advisers and doers for G-1.

G-1's proficiency may be measured against the yardstick "The ultimate of division organization and training is combat." G-1 must prepare the individuals of the division, within his sphere, for their first battle and all subsequent combat. It matters little whether his division is in initial training or in a rest area for rehabilitation, he must constantly look toward the next battle and each successive combat period. Constantly renewed combat effectiveness is his ideal—"fit to resume the approach march" is his goal.

Airdrome Defense

[From *Air Forces General Information Bulletin*, No. 9, February 1943.]

REPEATEDLY in World War II the loss of airdromes and airplanes on the ground has meant the loss of an entire campaign.

The southward march of the Japanese through Hong Kong, the Philippines, Malaya, and the Dutch East Indies was accompanied by relentless assaults on the bases of the United Nations' air strength. Germany hurled her legions into the Lowlands in the wake of decisive attacks on Holland's airfields; her transport planes landed in Crete after a vanguard of parachutists and glider-borne troops had made the initial thrust for control of landing areas. The battle for mastery of North Africa repeats the same story of this grim struggle for airdromes.

There is no fixed method or means for the ground defense of airdromes. The technique of the attack will vary with each new target and the defense must be fluid, limited only by the weapons at hand and the alertness, imagination, and ingenuity of the defending forces.

The enemy attack will follow one of five forms or a combination of them: sabotage, chemical attack, ground attack, bombing and strafing, and airborne attack.

a. Sabotage.—The weapons of a saboteur may be explosives or fire. In the Middle East hundreds of planes have been destroyed by small raiding parties who steal on to the airdromes at night and plant small bombs on the planes. Most likely targets for fire will be the highly inflammable fuel supplies, planes, and hangars.

An air alarm system and armed guards are the best defense against this ever-present danger. Expensive fencing with riot-type or electrically charged barriers is seldom practical on field airdromes.

b. Chemical attack.—Smoke screens may be used to cover the landing of paratroops and a nonpersistent gas like phosgene, effective for only a few hours, might be employed as a prelude to an airborne attack. A persistent gas like mustard or lewisite, spread by bombs or sprayed from planes, is the most likely type of chemical attack. Its use would indicate that the enemy does not intend to try immediate capture but wishes only to immobilize the airdromes.

Personnel should be supplied with masks and protective clothing to be donned when gas sentinels and the gas alarm system give the warning. Bomb craters and equipment are decontaminated by hand apparatus while runways are neutralized by a 500-gallon power-driven machine with a wide spray.

c. Ground attack.—Due to the characteristics of desert warfare, airdromes in Libya have been sub-

jected to simultaneous attack from the air and from mobile armored units. In many theaters, when the enemy has surged forward to the point where an airdrome must be defended against ground attack, it probably has already been abandoned as a base by defending planes. Thus its defense will follow the same principles as the defense of a similar area without an airdrome. Mine-fields, tank traps, and barbed wire can be used to deter the advance of enemy tanks, infantry, or cavalry.

d. Bombing and strafing.—High or low altitude planes or dive bombers are used in this type of assault. When it is designed to neutralize the airdrome, the bombing will be directed at all types of installations, particularly runways, parking areas, repair facilities, fuel storage, and AA batteries. When it precedes an attempt at capture, it will be concentrated on defense installations, avoiding runways and other facilities necessary for use by invading forces.

Low-flying planes will systematically strafe all visible personnel, machine-gunning the woods and other obvious hiding places.

To meet this air attack in an active theater, small airdromes will probably have an automatic weapons battery of eight 40-mm antiaircraft guns and eight .50 caliber antiaircraft machine guns. Larger and more exposed airdromes should have additional AA protection. AA automatic weapons should normally be sited 200 to 600 yards outside the airdrome perimeter, within 700 yards of each other and giving special protection to vulnerable installations. Larger caliber guns will be farther from the airdrome and cannot be as closely integrated.

Primary mission of AA artillery is firing against enemy aircraft but it has a secondary mission of firing against ground targets. Frequently it can be sited to perform this dual task so that after the ground attack has developed to the point where the enemy can no longer use his planes, the AA can swing into action against ground targets. The siting must be worked into the general plan to prevent our own guns from firing on friendly units during the rapidly changing picture.

Weapons must be prepared to shift to alternate positions prepared in advance, leaving the old positions as dummies, carelessly camouflaged. Personnel must have individual slit trenches nearby for their protection; this arrangement has consistently reduced casualties to a minimum.

e. Airborne attack.—Airborne troops include air landing soldiers, transported in powered aircraft or in gliders towed behind airplanes, and parachute

troops. They may be used separately or together, with either launching the assault. Normally, however, parachutists land first as an advance guard to clear the way.

Paratroop aircraft usually fly in a V formation of three or four planes, traveling slowly at an altitude of 200-400 feet during the jumping period. Paratroopers jump armed with light weapons such as pistols, carbines, submachine guns, and grenades. More light weapons, ammunition, mortars, and food are dropped by separate parachutes. Time of descent will be from 10 to 25 seconds, a platoon of trained men landing in an area 250 by 600 yards, a battalion, in an area 700 by 1000 yards.

Parachute troops are extremely vulnerable during the period of organization on the ground. This will average ten minutes although well-trained troops in favorable country can form for action more quickly. Once assembled, units will set out to block roads, cut communications, and move against important terrain features, fortifications, and ground installations.

Air landing troops require more advantageous terrain for landing than do parachute troops, and will seek out cleared areas near the airdromes, open meadows, river beds, or straight stretches of highway, although they can crash land in very rough country.

Since gliders and air transports can carry much heavier equipment than parachute troops, the air landing units may have light field artillery pieces, antitank guns, anti-aircraft guns, light transportation, small tanks, and light equipment for construction of landing areas.

Air landing troops are most vulnerable during the unloading and reorganization period.

In a typical attempt to seize an airdrome, the enemy might first land a few parachute troops the night before to cut communications and damage ground installations. They would follow this at dawn with ground strafing and an intensive air bombardment aimed at neutralizing defense positions.

Meanwhile parachute troops will land near the airdrome, the air assault landing support as they organize, attack objectives, and clear the way for air landing troops who will broaden and deepen the combat area. The attackers will be well equipped with accurate maps and information about all fortifications and installations which have not been skillfully camouflaged.

To meet an assault of this nature, the airdrome must be ready with a flexible defense prepared for any contingency and not tied down to fixed defensive positions. Highly mobile reserves are also necessary to strike at the landing troops before they can organize, collect their equipment, and be reinforced.

Organization of this flexible, mobile defense is the responsibility of the airdrome commander who may delegate it to the defense officer.

Depending on the time and men available, the de-

fense plan may range from general verbal instructions to an elaborate, detailed procedure. But whether simple or complicated, it must touch the following points:

a. Observation, alarm, and communication system.—Sentinels should be posted beyond the airdrome boundaries in observation stations overlooking potential parachutist landing areas. It is their job to direct friendly troops to the enemy and to keep the defenders from being drawn out of position by dummy parachutists. They will also give the alarm for approaching enemy aircraft or a chemical attack.

Since wires can be cut and wave-lengths jammed, the telephone and radio should be supplemented by flags, fireworks, and rifle shots. The time interval in an airborne attack is too short for the satisfactory use of vehicles or foot messengers.

b. Camouflage and dispersal.—Although an airdrome can seldom be completely camouflaged, anything done to conceal or disguise it will be an aid to its defense. Planes and installations must be dispersed and camouflaged so that they do not present profitable targets.

c. Assembly areas.—Personnel must keep gas masks, weapons, and ammunition close at hand and report armed and ready for combat at a previously designated assembly area when the alarm sounds. Everyone must fight when the attack comes. Everyone must have a definite job to do.

d. Damage control.—An airdrome cannot continue to operate under attack when vital installations and equipment are destroyed. Crews should be organized to repair runways, maintain communications, fight fires, and control and repair any damage as it occurs.

e. Immobilization of vehicles and equipment.—All vehicles not needed by the defenders should be immobilized to forestall their use by attacking troops. This can be done by removing the keys or the distributor, or ripping out essential wiring. The same part must be removed from all vehicles so as to prevent interchange of parts.

f. Liaison with supporting units.—General reserves which might be called in for the defense should be made familiar with the organization of the ground before the emergency arises.

g. Organization of the ground.—Terrain surrounding the airdrome should be studied carefully to determine where airborne troops can land and what approaches are open to attacking ground forces. This will decide the location of fixed defenses and obstacles and the disposition of mobile striking parties.

At nearly every airdrome there are certain vital areas which must be kept under fire to deny their use to the enemy. In rough country where the runways are the only suitable landing areas, most of the defenders are used to protect them. In more open country, other possible landing areas must be covered. It is up to the commander of the defending

forces to determine what is so vital that it should be held by fixed defenses.

When these defenses are within the airdromes, they should be protected by barbed wire and supplied with reserve ammunition, water, and food. They should be designed to permit all-around fire. Off the airdrome, they are normally not intended for permanent occupancy because the garrison must be free to attack enemy troops which cannot be brought under fire from the fortified position.

All weapon emplacements and defended areas must be well concealed, since preliminary bombing and strafing will neutralize or destroy poorly camouflaged positions. Furthermore, the attackers, laboring under difficulties as they attempt to organize, will be even more handicapped if they do not know where the defenders are.

Vehicles, heavy construction equipment, logs, rock-filled drums, and similar movable obstacles can be placed on runways and landing areas to prevent their use by enemy aircraft while keeping them available to friendly planes.

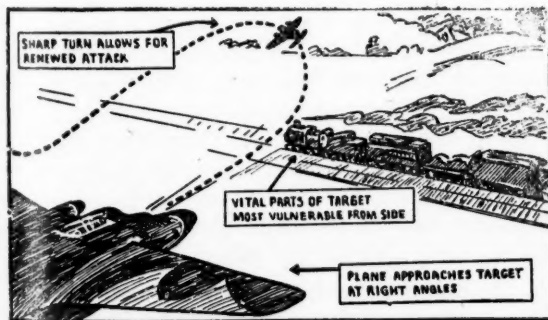
Areas off the airdrome where enemy troops might

land may be blocked with more permanent obstructions like cables, firmly anchored timber or steel posts, and ditches. A ditching machine followed by a grader can cut V-ditches which will stop wheeled aircraft. Care should be taken, however, that these obstructions do not draw attention to an otherwise successfully hidden airdrome.

When the airdrome can no longer be defended profitably, the commander may order its demolition under a previously prepared demolition plan.

Complete destruction is a major operation requiring ample time and a large supply of explosives. When neither is available runways and taxiways take first priority, followed by the balance of the landing areas, routes of communication to the airdrome, construction equipment, technical buildings, supplies of gasoline, oil and bombs, motor vehicles and unserviceable aircraft, and housing. If there is a few hours' leeway, landing areas that are not concrete can be slashed with wide, deep lanes by a rooter and bulldozer. Booby traps planted in damaged areas, underneath dirt or on obstructions, will slow up repairs.

Train-busters



RAF pilots who have long been active in attacking railway trains along the French coast are naturally silent about their individual methods, but it is said that the most successful attacks are rarely carried out head-on. Primarily the aim is to blow up the boiler of the engine, secondarily to give the engine an all-over wrecking dose which, if it does not produce a total casualty, will give the repair

shops weeks or months of work. Another advantage of attacking from the side is that it gives the French engine driver a chance to see the attacker coming and fall out on the off-side, leaving a stopped engine as a sitting target. Out of consideration for the lives of French citizens, only freight trains are ever attacked.

The Mosquito has been a successful train-buster because its immense speed makes it difficult for the defending train gunners to range on it as it comes in at a low level, and the plane being highly maneuverable, the pilot is able to bank out of the way of the exploding boiler at the end of the attack. Then, if necessary, he makes a tight turn and comes in again. One crew, deserting trains in favor of a power station, found they were able to make four attacks in this way in six minutes.

—From an article in *Britain*, British Information Services, New York, reprinted from the *London News Chronicle*.

The Battle of El Alamein

[Based on material prepared for the British War Office and published by the Ministry of Information in *The Battle of Egypt*, H. M. Stationery Office, London.]

ON 23 OCTOBER 1942 the British and German lines faced each other near El Alamein on a forty-mile front between the Mediterranean on the north and the practically impassible Qattara Depression on the south. These lines consisted of discontinuous belts of minefields interspersed with strongpoints and machine-gun and antitank-gun emplacements in a depth of several miles. The locations of the principal divisions along the lines are indicated on the sketch by the rectangular blocks. It should be noted that the strongest German force was closely concentrated in the north with other strong units and most of the Italians in the southern sector. The Axis center was lightly held, mostly by Italians. The British, on the other hand, had scattered their units rather uniformly along the whole front except for the powerful 10th Corps which lay in training areas far to the rear.

Apparently, the logical place for the British to attempt a breakthrough was west of Ruweisat Ridge against the weakly-supported center. The German generals must have hoped for, and perhaps expected, such a move, for they were well set to strike and destroy any penetrating force with a double-flanking movement from north and south.

The Allies were operating at the end of the longest supply line in history, extending 12,000 miles around Africa through areas made dangerous at many points by submarine and air attacks. The Axis had a relatively short supply route across the Mediterranean, but for several weeks in September and October the Allied air forces had steadily pounded the communication lines and the supply areas in the enemy's rear. It was claimed that not a single tanker got across the sea during this period and four-fifths of the Axis ships sailing from Greece and Italy were sunk or damaged. Thus the shortest route was not an unmixed blessing.

On 23 October a terrific Allied air attack was launched against Axis airfields, lines of communication, and concentrations of armament and troops behind the lines. Over a thousand sorties were made by air that day, and when ground action began the Axis air forces had practically been swept from the sky. Mine clearing had proceeded steadily every night for two weeks before the main drive was launched, and the sappers continued this activity throughout the battle.

The night of Friday 23 October 1942 was brilliant with moonlight. At precisely 9:30 PM ground ac-

tion began with a tornado of artillery fire from guns placed at intervals of twenty-three yards along a six-mile front on the sector in the north where the Germans were strongest. For twenty minutes this barrage continued.

At 10:00 PM British and Dominion infantry moved forward against the deepest part of the Axis line. By 5:30 on the morning of 24 October they had advanced on a six-mile front as much as four miles into the enemy's minefields. The limit of this advance is indicated on the sketch by the heavy line. Further advance was blocked for the time by deep, uncleared minefields ahead. It was a penetration that established a salient, but it was not a breakthrough.

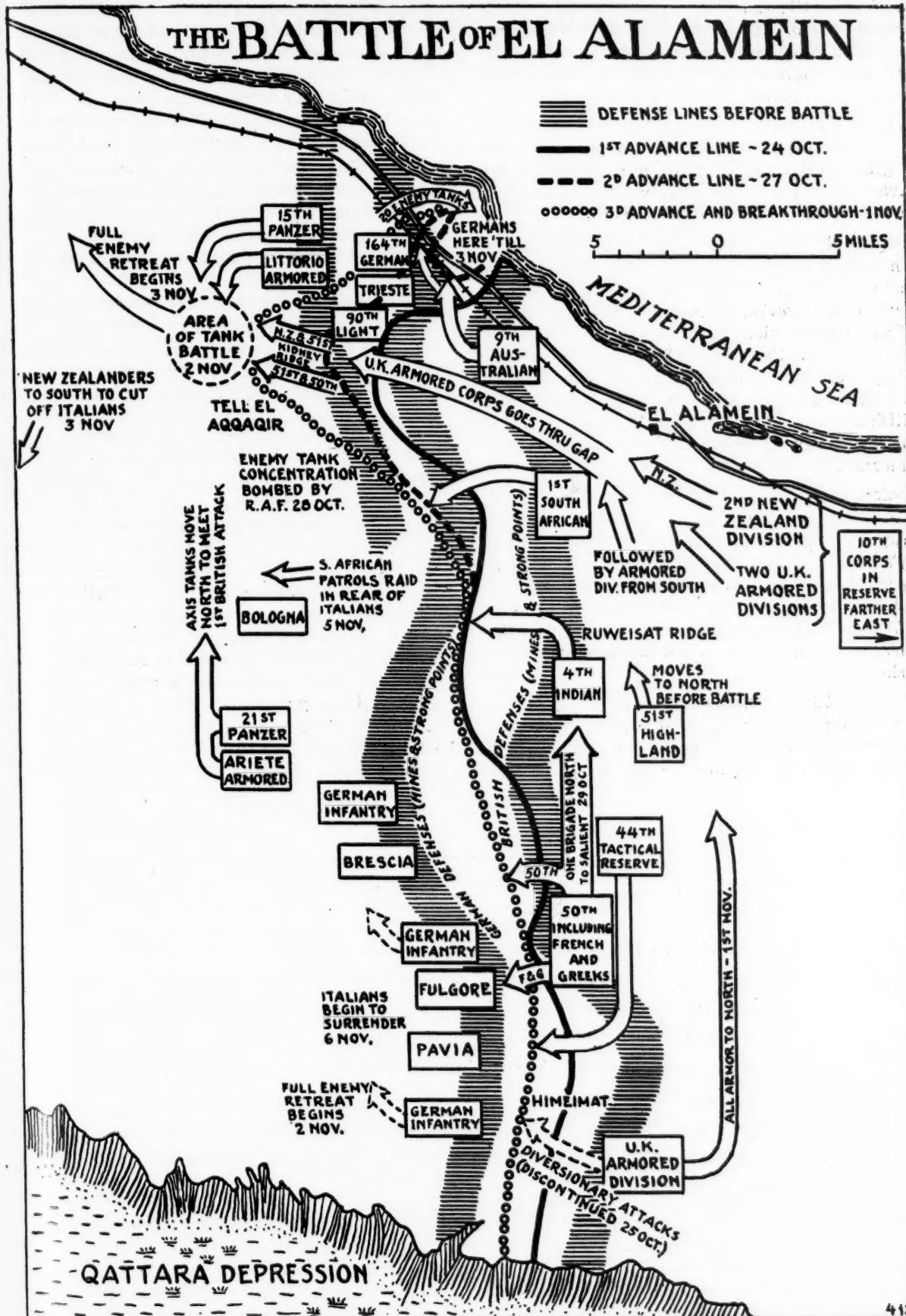
To the south, diversionary attacks were conducted by various units including the United Kingdom Armored Division in the extreme south near Himeimat (see sketch), preventing Axis units from moving to the point of the main effort.

No notable progress took place on 25 October, but that night the salient was widened to the north and south. The position of the advance on 27 October is shown on the sketch by the heavy broken line.

For six days, until 1 November, the battle raged about the salient as Axis counterattacks were thrown back one after another. The German armor was seriously depleted in these attacks but the British, in contrast, reserved their main armor intact well to the rear, only a few tanks accompanying the infantry to assist the advance. Thus when the time came for the decisive tank battle, the British were relatively strong. Meanwhile, gradual progress was made each night in advancing the Allied line and in clearing lanes through the minefields.

The first decisive event of the battle was the completion of the breakthrough by a brigade each from the 50th and 51st Divisions and the New Zealanders. Advancing on a four-mile front on the night of November 1-2, they pushed the spearhead of the salient three miles to the west of Kidney Ridge through the last of the minefields. The dotted lines on the sketch show the Allied position and the breakthrough as it was on 2 November. The infantry and the sappers had completed their work in nine days of battle. They had opened the way, and it was now the turn of the tanks.

The 10th Corps had long been in training for this moment. Leaving a dummy camp to deceive Axis observation, they had come up to the line on the



eve of the battle and were now ready and waiting to exploit the breakthrough. Also, on 1 November, the United Kingdom Armored Division, whose diversionary activities in the south had now served their purpose, moved north to join the main effort.

The British armored forces moved into the salient and through the gap, and on 2 November occurred the great tank battle of El Aqqaqir, the second decisive event of the struggle and the turning point of the whole action. It was over in one day.

Practically all available Axis armor had already been massed in one place where the breakthrough was threatened. Weakened by their abortive counterattacks of the previous days and by heavy pounding of their concentrations from the air, the Axis tanks were in no condition to form in two parts, as they had apparently first intended, in order to drive from north and south against the flanks of the powerful British armor in its penetration. Only one form of counterattack was now practicable for the Germans—a massed frontal assault.

Before daybreak on 2 November, and just after the infantry breakthrough, an Allied armored infantry regiment was already raiding behind the enemy's lines. Then an armored division and another armored brigade moved through the gap. All day on 2 November the battle of the tanks raged near El Aqqaqir with heavy losses on both sides, but that night El Aqqaqir was taken and the Axis armor was crushed.

As the battle progressed at El Aqqaqir, evidences began to appear indicating that Axis infantry was withdrawing from El Alamein line and the next day the signs were definite. In the south the Ger-

mans commandeered all transport for their own use and abandoned the Italians to whatever fate might be in store for them. Hardly a man of six Italian divisions escaped, and even the Germans had to leave behind over 8,000 of their own men besides their killed and wounded. The battle cost the Axis 75,000 men, and more than 500 tanks and 1,000 guns.

On 4 November the enemy was in full retreat. Pursuit was severely hampered by torrential rains, but eight days later, on 12 November, the last Axis effectives were cleared out of Egypt and the long trek across Lybia to Tripoli and Tunisia was under way.

In summary, the following points should be stressed. The Allied attack apparently took the German generals by surprise, first, because the main effort was directed at the strongest and deepest point in the Axis line, and second, because a form of attack was used that had long ago been discredited in World War I on account of the heavy casualties involved and the impossibility of getting through a series of deep lines and decisively exploiting the gains. This form of attack consisted of (1) a heavy artillery bombardment to soften the defended lines, and (2) an infantry charge to drive a wedge into the opposing defenses. In Egypt, however, such an attack led to success because (1) the British thereby reserved their armor intact for the decisive battle behind the enemy's lines, (2) there was no other line within hundreds of miles for the enemy to fall back upon, and (3) the Allied control of the air made any reorganization difficult or impossible in the desert. Once broken at El Alamein, there was nothing for the Axis army but a running retreat half-way across Africa.

All warfare is based on deception. Hence, when able to attack, we must seem unable; when using our forces, we must seem inactive; when we are near, we must make the enemy believe that we are away, and when far, we must make him believe we are near. Hold out baits to entice the enemy. Feign disorder, and crush him. If he is superior in strength, evade him. If he is taking his ease, give him no rest. If his forces are united, separate them. Attack him where he is unprepared, appear where you are not expected. These military devices, leading to victory, must not be divulged beforehand.

—Sun Tzu on *The Art of War*, about 500 B.C.

Amphibious Operations

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UNTIL recently the subject of amphibious operations had for most of us merely an academic interest. The reasons for this were natural. Landings on hostile shores had been rare in our military history and the possibility of such operations in the near future seemed remote. However, after Pearl Harbor and the subsequent Japanese conquests in the South Pacific, interest in the matter revived. We faced the realization that sooner or later we would have to engage in some form of joint overseas operations in the South Pacific in an effort to retake this lost territory. We also realized that if we were ever to overthrow the Germans, some day we would have to effect a landing on the shores of Europe. As history has proven, none of these landings would be easy. Each would be opposed by an increasingly determined stand by the defenders, and unless our landing forces were thoroughly trained and equipped, the chances for success would be very small. It was by sheer necessity then, and practically overnight, that amphibious operations became of vital importance in our military training and thought.

Not long afterward, newspaper headlines such as "US Troops Land on Guadalcanal," "Allies Effect Landings in North Africa," "Thousands Pour Ashore on Attu," "Munda Base Threatened," and "Allied Invasion of Sicily," proclaimed amphibious operations in the various theaters. Behind these headlines, however, there is another unwritten story of months of planning, preparation, coordination, and cooperation.

For when the current military situation or existing Army and Navy war plans indicate the necessity or desirability for amphibious operations in a particular theater there are many things to do and many factors to be considered.

The first and most important consideration is the availability of shipping. This is the biggest problem confronting an amphibious operation and it will be the deciding factor as to whether or not the operation will be undertaken. There are just so many ships available and they are constantly in use over the many sea routes. Consequently a reshuffling and reassignment will be necessary in order to permit the concentration of the required amount of transportation. In some instances it would be inadvisable or impossible to do this, with the result that the operation contemplated would either be postponed or cancelled.

If there are sufficient transports, the next consideration is the availability of naval attack vessels to convoy the transports and support the landing. Here

too, naval activity in the various theaters may require the presence of the entire naval forces in those theaters and leave none available for the proposed operation.

Likewise, sufficient ground forces trained in amphibious tactics must be made available.

When the necessary means are provided and it is finally decided to undertake the operation, particular attention must be paid to the availability of advanced air bases.

In this connection, recent developments have emphasized the growing importance of air support. It is now so important that the success or failure of a modern landing operation will usually depend on the availability of aircraft and the support that it can render.

Naturally, land-based aircraft is preferable to carrier-based aircraft because the carriers are extremely vulnerable to hostile submarine and air attacks. In many cases, though, available land bases will not be within effective range of the attack area. As a result, carrier-based aircraft will have to be used until such time as land bases can be seized by the attacking forces.

In other words, where the distance is so great that land-based planes cannot be used initially, the speedy seizure of land bases will be mandatory.

To illustrate, the task group of the Western Task Force that landed at Port Lyautey in Africa was given the initial mission of seizing the airport at Port Lyautey. Carrier-based aircraft supported the action until the airport was seized, at which time P-40's waiting at Gibraltar were flown in to take over.

As a matter of fact the success of Japanese landings in the early stages of the war was due in a large measure to the support that they were able to render succeeding operations by the seizure of advanced bases.

When the operational plan is prepared, a directive is issued to the units concerned. This directive need not be in very great detail but it should settle certain factors without which proper planning could not proceed with any assurance of finality. Above all it should convey appropriate and unquestioned authority to those who are to be held responsible for the results. The Army Task Force commander and the Navy Task Force commander should be announced by name and some form of unity of command established: either a limited unity of command, in which the service having the paramount interest during a

particular phase of the operation will have control during that phase, or a complete unity of command vested in one commander.

Finally, the directive should announce D-day (the day the landing is to be made) since all planning is based on that date.

When the Army Task Force and the Navy Task Force commanders receive this directive they in turn must get together to settle certain questions that likewise require joint action. The first thing to be determined is the time schedule. The time remaining from receipt of the directive until sailing date must be put to the best use possible for training and preparing the forces involved.

Then the Task Force commanders must plan the scheme of maneuver. First the Army indicates its desires; then the Navy indicates whether or not it can support that particular scheme of maneuver.

H-hour (or the hour on D-day at which the landing will be made) must also be settled. From a Navy viewpoint a daylight landing is the best. It permits them to make use of landmarks for navigational purposes in approaching the beaches. It also makes their problem of putting troops ashore on the right beaches much simpler, for that is quite a task in strange waters during darkness. A daylight landing also permits maximum use of air and naval gunfire support.

As an argument against a daylight landing the army contends that surprise is lost, and it is then much more difficult to get the troops ashore in the face of the aimed fire of the defenders.

Moreover, it takes several hours to get the troops ashore and the defenders will have time to concentrate air and ground reserves at the threatened point. Losses therefore will be greater in a daylight landing.

However, if a daylight landing is necessary some of the disadvantages can be overcome by the effective use of smoke and by complete mastery of the air.

It is believed that in all cases an open mind should be kept, and the subject approached with the question, "What will be gained in a daylight landing that will be lost in a night landing?"

Finally, when all this is done, the Task Force commanders issue directives to train, supply, embark, and carry out the proposed operation.

Now let us consider an infantry division—one part of this task force. When it receives the directive the staff and the troops will have a great deal to do.

As for the staff, G-1 must arrange for replacements and weed out misfits, including officers and enlisted men. G-2 must study beach and hydrographic conditions and the hostile situation in the landing area. G-3 must arrange for a reorganization of the division, tailoring it to fit the shipping

assigned. He must also arrange for intensified training, and prepare the plans for the expedition. G-4, of course, is interested in supply and the many problems involved in supplying an amphibious operation. He must arrange for supplies of the right kind, at the right place and time, and in the required quantity.

As for the troops, there will be many tasks involved which will be unfamiliar to the majority taking part. So, obviously, special training will have to be carried out to insure cooperation and familiarize all concerned with these special tasks involved.

Planning for this operation must be joint and control must be centralized. Higher headquarters in many cases will actually prepare the plans for the next subordinate unit.

On the other hand, during the execution stage, control must be decentralized, at least during the initial stages of the operation—that is, during the approach to the beaches and the actual landings and until the beaches have been secured against hostile light artillery fire the division must decentralize operations. The basic unit is the Battalion Landing Team. This is a reinforced Battalion Combat Team with nonessential men and equipment deleted.

Planning must be backward. The entire operation hinges on the tactical plan of operation after the troops have landed. Based on these tactical plans, loading tables, embarkation schedules, debarkation and approach schedules must all be worked out in detail and coordinated with the Navy. Sometime just prior to sailing, a full scale dress rehearsal should be undertaken with the Navy firing the shore bombardment and the Air engaging in air bombardment and strafing.

In all this preparatory and planning stage there are many problems that must be solved by the division. There are two in particular, however, that always give trouble and are worthy of mention.

The first is the combat unit loading of the transports. Obviously, transports must be loaded so that the troops and equipment come ashore in the proper order and ready to fight. This is called combat unit loading and is based on the tactical scheme of maneuver rather than on making maximum use of the ship's cargo capacity.

To insure as much as possible that the transport will be correctly loaded several Transport Quartermasters from the division are sent to a Transport Quartermaster school which is run by Task Force or higher headquarters. At this school the TQM studies ships' characteristics and various methods of loading.

When it comes time to start loading, units furnish the TQM's with cubic measurements of equipment to be taken and the priority in which it is to be unloaded. With this data the TQM in conjunction with

AMPHIBIOUS OPERATIONS

the ship's captain then works out the details of loading the ship. Obviously a great deal depends on him. And unless we want a crate of oranges to come ashore when we are expecting a case of ammunition, it behooves us to get the best man possible for the job. It is also well to remember that if the ship is loaded incorrectly it cannot be changed in transit. Equipment comes off in the reverse order of loading.

The second problem is the rapid clearing of the beaches of personnel and supplies as fast as they come ashore. This is absolutely necessary since the beach is the bottleneck. To avoid excessive losses and reduce confusion the beaches must be kept cleared.

To avoid all this, thorough prior planning and preliminary training is essential. Palette loading of landing craft and the use of bulldozers on the beaches are very helpful. The bulldozer should be sent in as early as possible. It has a multitude of uses and is well worth the space it occupies on the transport.

Although several successful landings have been made and each has furnished us with valuable lessons learned, let us not forget that there are many, many more landings to make and a great deal more to be learned. Consequently, it behooves those of us who are to take part in these future landings to profit from the experiences of those who took part in the earlier landings. From reports received, these

are some of the more important lessons learned:

1. Adequate plans and alternate plans must be prepared. A staff naturally contemplates the success of its own brain child, but it must be remembered that all or part of any plan may fail and there must be alternate plans to meet that situation.

2. Logistics is the most important factor in an amphibious operation. G-2 and G-3, of course, always work together, but the real team here is the G-3 and G-4. As soon as adequate troops are landed, priority must go to administration and supply instead of to more troops. Your supply system must be firmly established if you are to succeed.

3. Men and equipment must be balanced. The soldier must come ashore properly equipped and ready to fight. He should not be loaded down with unnecessary items. Equipment must be kept to a minimum.

4. Close cooperation and coordination between all the services, Army, Navy, Marine, and Air is absolutely essential. This is not a one-man show. In no other undertaking is teamwork and cooperation so vitally important.

And once again, let us all remember that the subject of amphibious operations is no longer merely an academic one. It is now a stern reality of the utmost importance to each and everyone of us, for if we are to succeed it means the very best in brains, brawn, and matériel that it is possible to get.

The following extract quotation from a report by a corps commander overseas in the Pacific is communicated for your information: "Our anti-aircraft fire also is excellent. I have been privileged several times to see our searchlights locate hostile bombers which, as soon as they were illuminated, were shot down in flames by our night fighters, to the acclaim of thousands and thousands of spectators in the darkened coconut groves." Similar reports have come from other overseas theaters and should serve to stimulate the training of antiaircraft units here at home. My congratulations.

—From a communication by Lieutenant General L. J. McNair, U.S.A., Commanding, to the Commanding General, Antiaircraft Command, Richmond, Virginia.

Do You Teach?

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THE RESPONSIBILITY for doing a good job of teaching cannot rest lightly upon officers and noncommissioned officers within any military unit. Success in combat depends greatly upon the effectiveness of instruction during periods of training. Admittedly these are trite statements. However, certain factors essential to doing a good teaching job are not trite and cannot be ignored. These factors are applicable to teaching anywhere and at any level. They must be considered, if success is to be achieved. Ignorance of them leads to the question: "Do you teach?"

The answer is in the affirmative for all individuals when consideration is given to indirect teaching. Whenever two individuals are together indirect teaching goes on simply through the interaction of the two personalities. The relationship alone affects the behavior of each in many ways. An interchange of words is not even necessary in such teaching for the overt behavior of each individual may lead to a further development of certain concepts in the thinking of the other. Generalizations develop from such indirect teaching and frequently lead to prejudices for or against the type of behavior exhibited by the other person. The results of indirect teaching are more commonly blanketed by the term "experience."

When the question is raised as to whether or not an individual teaches in the formal sense of classroom teaching, then the answer from most persons would be in the negative. Not only should this negative reply be given by the majority, but it should also be admitted by many who go through the motions in classrooms. Many who teach carry through their attempts with no clear-cut concept of what they are trying to accomplish. Such teachers most frequently miss their target because of a failure to analyze their mission and to plan their actions toward a definite and clear-cut end. Because of this they become purveyors of innumerable unrelated facts, rather than interpreters of these facts and guides in the synthesis of facts into concepts and principles in the minds and thinking of students. Details are regurgitated to students through a middleman dignified by the title of teacher. Teaching is basically more than telling. It is the direction and stimulation of thinking so that new and more effective behaviors emerge. In simple terms, teaching should result in students who have expanded their ability to carry on their day-to-day jobs more effectively. This increased effectiveness should pro-

vide a broader basis from which to plan further action in new situations.

The task of teaching is not an elemental one. It is one which requires analysis, planning, and the ability to guide the thought of others. All of these requirements are interrelated, with the last being of the greatest importance. Fortunately, this ability to guide is influenced greatly by the other two. In other words, through analysis and planning, means are suggested which achieve the greater end of guidance and direction. It should then be of value to give brief consideration to what is involved in these first two steps essential to successful teaching.

The process of analysis and planning possesses a unity of function since one phase very seldom operates in isolation from the other. As analysis goes forward, leads to planning emerge in the thought stream of the analyzer. However, analysis provides the basis and stimulus for planning and for that reason a good teacher must first determine, through analysis, the ends which he seeks. In the overall picture of a total course this requires breaking down a general statement of purpose to the specific knowledge, concepts, principles, and techniques which the student may be expected to master through the experiences gained in the course. This means nothing more than establishing the changes which must take place in each student, if the course is to be branded with the label of success. This comprehensive, but specific, statement of purpose becomes the core around which a curriculum is constructed. Also with respect to the individual teacher such a statement becomes the base of reference for every aspect of his teaching.

Working from the established base of operations the teacher then determines for each period of instruction the two or three basic ideas or principles which should become a part of the student. At the same time the relationship of these subgoals to the purposes of the total course must be clearly conceived. Unless the latter condition is present there emerges a course of instruction which is kaleidoscopic and confusing to the consumer. To students this is one of the great weaknesses of most courses. They never achieve a sense of progressive construction of related ideas, facts, and techniques, into increasingly larger concepts applicable to more and more complex situations. The natural result is the creation of a day-to-day approach to learning with each daily experience pigeon-holed neatly with no attempt to tie into the previous day nor to project the implications of what is learned into the future. The students become

unthinking robots for the storage of unrelated bits of knowledge and not synthesizers of related parts leading to a functionally meaningful whole which is new and practical. To achieve the latter, then, the good teacher in planning does not become involved in the minutiae of subject matter the moment a teaching assignment is received. Rather, the good teacher begins a process of analysis to determine exactly what is to be accomplished in the mind of the student. This is nothing more than determining an objective for the teaching attack. A military operation must possess an objective around which to develop maneuver and the same is true of teaching.

After establishing objectives the teacher then turns to a consideration of the means by which the objectives may be achieved. The means to be used in driving home ideas and principles must first be determined in a broad sense. To jump into details at this point is apt to be fatal to good teaching. Details are important in illustrating and building ideas. They are seldom important in their own right, for details change with situations while sound principles operate in a variety of situations. Rather than becoming immersed in minor points, it is essential in considering the means to conceive of the principles being taught as products ready for the sales market. The question is how to sell the product to the consumer. No two persons will have exactly the same sales approach, but there are certain basic techniques which remain relatively constant, and the same is true of teaching.

Each idea or principle which is part of the objective must be approached through a series of progressive steps which are logical and simple. To determine how these steps will be developed requires that the teacher give some consideration to the ability and background of the students. The sales market and the degree of sales receptivity must be studied. Students will come into the classroom with a great variety of backgrounds and abilities. The teacher must aim a little below the average of the group. Even then the usual level hit will be somewhere around the middle. The brighter ones may suffer a little, but the majority will learn something. Student abilities cannot be ignored in any part of the preparation for teaching. Certainly this is true when selecting the means of teaching. With some groups an abstract idea can be approached orally without visual aids. With others the approach must be primarily visual. In general a combination of oral and visual means will prove most satisfactory.

Knowing the group being taught, the teacher is then able to decide the degree of simplicity which must be achieved in moving toward the teaching objective. Presentation of a refinement in the use of methods to a group of well established physicists would require considerably less simplification than

would be the case in presenting the same material to a group of young engineers. In either instance, however, the teacher would be planning to build on the knowledge already possessed by those being taught. The good teacher plans to organize his teaching materials in a manner which definitely moves on from the knowledge the student already has derived from previous class sessions and reading.

As analysis and planning progress, consideration must be given to the points at which such aids as questions, slides, charts, anecdotes, and other types of illustrative technique will be used. These become the specific means to be used to clarify in the minds of the students the progressive development of an idea or a principle. Such means are not utilized indiscriminately. Too often, slides, for example, are interjected in a teaching presentation for no other reason than the fact that other instructors use them. Each specific technique must be justified in terms of the contribution made toward the achievement of the teaching objective.

Questions should be looked upon primarily as stimulators to thinking. It is not necessary each time a question is raised that a student be called upon for an answer. Many questions may be answered by the teacher and the purpose of questions still be served. In setting forth questions the following points are worthy of consideration:

1. Questions should be progressive and lead students to keep a step-by-step construction of a principle so that the principle becomes an inherent part of the students' thinking.
2. Provide a pause after stating a question so that all students may attempt an answer.
3. Use simple and accurate questions where only a few alternative answers are possible.
4. Avoid ambiguity in stating questions.
5. Above all else the teacher must be sure in his own mind why the question is posed and where the answer should lead.

When slides and charts are used in the teaching process consideration should be given to the following points:

1. The purpose, relevancy, and significance of the visual illustration should be clear to the student.
2. The points to be made by the illustration should be understandable, simple in composition, and to the point.
3. There should be a concentration on specific points and these should be emphasized by eliminating nonessentials.
4. Avoid complexity by using series of simpler slides, or charts, rather than attempt to incorporate everything in a single illustration.
5. Reality, action, contrast, comparison, or continuity should be utilized so as to stimulate student thought.

6. Slides should be presented graphically and various techniques, such as pictographs, stick drawings, etc., utilized.

The result of the analytic approach should be the skeleton of a teaching plan. There may be little logical sequence in the plan at this point. As the meat of subject matter is placed on the skeleton a rearrangement is made of the various parts into a logical sequence for the total presentation. This final step is in contrast to the general tendency for teachers to begin with fixed subject matter with little regard given to actual teaching objectives. Objectives

must come first and then materials and means for reaching these objectives developed and organized in light of their possible contribution to the achievement of the objectives. There is no easy road to good teaching. Teaching is not an elemental undertaking. Only through careful study and analysis can teaching become effective. Each teacher must evolve his personal technique and approach to his job. However, the teacher who knows where he is going and why, and who thinks and teaches in terms of ideas will be able to answer in the affirmative the question—"Do you teach?"

The Artilleryman

In a firing position before Leningrad the commander of an artillery regiment reported to the commander-in-chief of an army the high losses among the officers of his regiment, whereupon the commander-in-chief declared: "Every artilleryman has saved the lives of twenty infantrymen!" This sentence should be inscribed in the heart of every artilleryman as his flaming battle cry. Indeed, the statement may be expanded: "Every firing artilleryman can save the lives of a hundred infantrymen and even more if he knows how to use his weapon effectively!"

The artilleryman, that one individual, gives the command, "Fire," and 330 kilograms, 680 kilograms, or more of iron fly against the enemy within one minute and with more or less accuracy depending on the firing skill of the "individual." Only those who understand this process can have an idea of the power and force which the artilleryman possesses on the field of battle.

A commander of an artillery regiment in Russia called every observer to account for every abortive attack or enemy breakthrough. Sometimes when an attack was stalled it was not the battalion commander concerned who was criticized but the artilleryman who was supposed to support the battalion, for he was unable to break the enemy's resistance although his weapons and the ammunition at his disposal should have enabled him to do so. And if, during an enemy attack, the artillery did not fire well, how could the infantry left to its own devices hold out against superior enemy forces?

During the battle the artilleryman's every thought must revolve about the question: "How can I aid the infantry more effectively?" In the morning when he awakens his first thought must be: "How can I

best support 'my' infantry during today's attack?" And at night his last thought before falling asleep must be: "Have I prepared everything in such a way that in case of an enemy attack no harm can come to 'my' infantry because my barrage will destroy the attack?"

On the day of battle the alpha and omega of all his plans and actions must be: "Upon me lies the responsibility for reaching today's objective, and with the least number of losses. How can I perform my task most successfully? Where can I open the most favorable and easiest path for the infantry's advance by effective fire against the enemy?"

In spite of what has just been said the artillery will never be able to decide the battle by itself. In the last hundred meters of the attack, in the man-to-man fight, the infantryman will have to battle without the artillery. And the battles in the east have afforded sufficient proof that even after the strongest artillery fire there will be here and there stubborn enemy resistance which can be broken only by the infantryman and the shock troops. Here is where the assault guns on armored, self-propelled mounts (*Sturmgeschütze*) prove their particular worth for the infantry.

But always it must be the aim of the artilleryman to show utter daring and make the fullest use of his weapons and ammunition in order to break up the enemy attack and reduce the losses of his own infantry to a minimum. And so the artilleryman, the firing observer, who in most instances squats in the same rifle pit with the infantryman and jumps over the same trenches, is the infantryman's first and most important helper.

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Shooting on a Forest Firing Range

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from an article by Colonel Berger, German Army, which appeared in *Deutsche Wehr*.]

EVEN before this war, there were officers every now and then who requested that they be permitted to make practice fire on shooting ranges more natural; demands were repeatedly made for more realistic training of companies in practice combat fire.

In the campaigns of this war it has again become evident that disadvantages are associated with the formal handling of preliminary and practice combat firing methods dictated by considerations related to safety. Particularly, our experiences in Soviet Russia have shown that the German soldier had great difficulty in accustoming himself to fighting in dense forest or brush-covered terrain. This has led to the introduction of forest firing ranges everywhere.

Training department 1 (Firing School) of the Infantry School, pursued the following course:

In addition to the firing ranges on the drill ground, a new firing range was laid out in the densest woods and most brush-covered terrain that could be found. In this area a great number of target groups were set up, as true-to-life as was possible on the basis of experiences gained in Soviet Russia. Two requirements were made: (a) The enemy was to betray his presence only by the gun flash when a shot or a burst of shots was fired; otherwise, he must remain absolutely hidden. (b) The enemy must be able to show up not only to the side but even in rear of groups working their way through the woods. As may be readily understood, it was necessary to depart from the idea of firing from the rear with loaded shells, since this condition cannot be fulfilled on any drill ground. But the requirement of being able to combat hostile forces showing up over the largest possible angular range to right and left was met. Since the enemy had to be so hidden and concealed that he was absolutely invisible to the rifle troops working their way ahead, every single target, every pasteboard target, had to be provided with target fire ["enemy" fire from the target, simulated by blank cartridge discharges or some other mechanism]. It had to be possible to handle pasteboard target and target fire independently of one another. It was necessary, however, to operate both pasteboard target and target fire from very close at hand. This brought about the following results: Wires from thirty to fifty meters long, and in one case seventy meters, were run out from the target and target fire. These terminate on a panel with which the trainer

must be perfectly familiar. The trainer goes along behind each rifleman and manipulates the target when necessary for the purpose of the exercise. The rifleman creeps cautiously along from bush to bush, observing every bush, the top of every tree. The trainer behind him is now in a position, as he approaches one or the other of the many targets, to cause target and target fire to function. If the rifleman does not recognize his adversary (the pasteboard target) at the first shot, the trainer must be able to repeat the shot. In case firing is continued, he can bring about a regular duel between the paper target and the rifleman, after which the marks on the target will show who was the victor.

The forest firing range is intended to be the crowning feature of firing training. Even though in time of war we may discard many of the principles learned during the short period of training, not the least trifling should be indulged in in the training for firing. Even though these principles are old, they are by no means fossilized. A person desiring to attend high school must first finish the grade schools whose courses he must use as a basis for subsequent studies in high school, and this grade school work is now "the grip around the stock," the "eye raised, finger extended" . . . etc., and will always remain so. By grade schools I mean the period from these first holding-and-aiming exercises to the last exercise on the school rifle range. High school, then, is the time from the first steps of combat exercise to practice combat firing, inclusive. College, however, is training in close fighting, forest fighting, etc., up to combat firing with loaded ammunition and, as its final crowning, the forest firing range.

Naturally, in a forest firing range such as this, recruits of eight or ten weeks' experience cannot be engaged.

No riflemen are sent singly into such a firing range; but rather, able scouting detachments of the strength of a group or of a reinforced group or more should be engaged. This requires a certain width for the forest firing range. Aside from this, I desire that the group leader should have free hand in his decisions. I do not wish to confine him to a definite course either through orders or the employment of umpires; as a group supported on right and left or by means of the marching compass, he must always advance in the right direction but, within these limits, be able to make his own decisions. With this in view, it is necessary that so large a number of targets be represented that in whichever di-

rection he goes, he will run onto other groups of them. The greater the angular range of fire that can be permitted on the particular forest firing range when taking into consideration the safety of persons on the outside, the more I am able to let the group be fired on by targets alongside which they have already passed. If the angle is very small, these groups of targets are not operated, hence are passed without being fired on exactly as the Soviet Russians frequently permit the advance troop units to pass them by.

Since no shelters are used and since the wires running to the targets need not be long, it is possible at any time to change the target arrangement, thereby always keeping the forest firing range interesting and different. It goes without saying that a group which is to go through the forest firing range using loaded cartridges must have done the exercise from one to three times with blank cartridges. If I lay out the forest firing range with sufficient breadth for several groups to work together alongside one another, I am able to make it possible for groups to operate always in a section where the targets are new to them.

Something relative to the requirements: For such a forest firing range there is required (a) suitable terrain, (b) targets, (c) equipment for representing fire from the targets, (d) wires.

(a) The terrain: A densely wooded and brush-covered terrain of as varied a nature as possible is required. A bit of stream or marshy terrain, rises, etc., increase the charm of the course and make it more varied. Terrain from two to four hundred yards in breadth by five hundred to a thousand yards in depth is needed. If the forest firing range is to be used for firing with loaded ammunition and not solely as a practice range, it must meet the requirements of safety regulations. Generally speaking, this will be possible only in an army maneuver area.

(b) Targets: First, hinged targets in the form of head or breast targets are used. These are located in the underbrush, in bushes, on the edge of depressions or entrenchments, behind tree trunks and in trees as tree snipers. Back of these targets pieces of cardboard about the size of a man's body may be placed as ground targets. Also needed are machine-gun targets and figure targets by means of which counterattacks may be constructed. In the embrasures of bunkers, which can be constructed of tree trunks and earth in the form of forest bunkers, pieces of pasteboard are also placed in order to register hits in the embrasures. It is not necessary to construct concrete bunkers on the forest firing range, in fact they should not be, as in this case the action of a group would not be natural. Rough forest bunkers and embrasure positions must be erected, however, just as the Russians had them in the densest of forests. If one has free rein with respect to ter-

rain, it is recommended that firing paths be laid out in the same manner as was done by the Soviet Russians.

(c) Representation of target fire: Equipment for representing target fire is available in maneuver areas. Target fire apparatus No. 38 is best adapted to the representation of machine-gun fire. There is no object in installing an excessive amount of machine-gun fire, for this would render the action of the single groups unnatural. It is, however, as we have stated above, absolutely necessary that every single target be provided with target fire. For this purpose several short sections of barrel each with a simple firing-pin, may be fastened on a board. These barrels are loaded with blank cartridges, the firing-pin drawn back to its rearmost position and secured by a small pin. The trigger wire is attached to this small pin. When the trainer back of the rifleman pulls on the wire, he pulls the pin out, the shot is fired, the rifleman acts. If the rifleman does not find the target at the first shot, the trainer is able to produce a 2d, 3d or 4th shot, depending on how many such short barrels have been attached to the board. The second pin is attached to the same wire by means of another piece, fifty centimeters long, provided with a sliding loop. The third and rest of them are attached again in turn by pieces of wire at least fifty centimeters long, so that only one pin at a time is drawn out.

If one is not able at first to arrange for this sort of representation of fire, it is possible to get along by the use of practice hand grenades and practice detonators. These hand grenades, likewise, are fastened on a board alongside one another. The buttons on the detonating cords are again, in this case, fastened together by means of pieces of wire having sliding loops being fifty centimeters in length so that one hand grenade after the other can be detonated in accordance with the desire of the trainer.

Such firing on the forest firing range requires a relatively large number of umpires (instructors) and very careful schooling of these instructors. As far as possible, every man is followed by a corporal or sergeant who is fully familiar with the range. Since every single rifleman is to work his way forward in a manner corresponding as closely as possible with that found in actual war, there is the danger that a man will mistake one of his comrades, who has worked his way a little ahead of him and is off to the side, for a target. Consequently, with each man the umpire must act in a way different from that used by umpires in combat practice. He must maintain himself fully erect and in view. He must, therefore, when he is in charge of a rifleman who is toward the rear or of a machine gun in position and covering the advance of rifle troops, keep close track of how far in advance the other umpires are in order to know how far ahead the advance elements are. The umpire (instructor) must be

plainly marked by means of a white band. He also wears a steel helmet the same as the rest of the troops for, at moments, when hand grenades are thrown or when the men are brought close to their own trench mortar, he must conduct himself in the same manner as the men. It is, therefore, difficult for him to remain plainly visible at all times on the one hand and, on the other hand, to look out for his own safety. It has been found in practice, however, that this is far from being as difficult as it sounds here.

A great number of exercises can successfully be given on a range of this kind, depending on its length or breadth. If the range has a length of about one thousand yards, for example, it goes without saying that a group will not work its way through the entire length, but will be relieved.

In the course of the range, there should be stretches where no targets show up. If the instructor makes skilful use of his target fire in connection with assignments which he has given the group, this trip through the forest firing range causes great joy to the men. Young officers and old sergeants who had been at the front have gone over the range with the same delight as young soldiers who have not yet met the enemy. It is up to the instructor to use his skill and his own war experience in not permitting the exercise to be a rush drive for the attack but, rather, guarding the men from being overly anxious to advance.

Very deep ranges have the advantage of making it possible to go from easy target groups to increasingly difficult ones during progress through the

range so that the last tasks may be the crossing of a water course or a marshy area or an attack on a bunker. Broad ranges, on the other hand, have the advantage of making it possible to train several groups alongside one another. For reasons of safety on the part of our own men, it is impossible, of course, to engage several groups alongside one another with loaded ammunition. Hence narrower but longer ranges prove more valuable since with these, as we stated above, groups can be changed in certain sections—say after the combat of two or three target groups—and the others led along as spectators. While those who are practicing firing are at the end of the range, groups in the rear can be preparing for another trip over the range.

Great variety is important. Insofar as is possible in the forest firing range, which should be the crowning feature of all combat activities of the soldier, there must be found everything that he needs for such a fight in the forest under difficult conditions. There must be, therefore, a system of positions whose trenches have to be rolled back. There must be target groups representing every kind of close section which can be engaged. After passing a section with a small stream or river or after breaking into the enemy's system of positions, tanks must be found which represent an enemy counterattack with tanks. Here the group must practice close combat with tanks during attack, using the equipment available in the attack. Also, at the end of the wooded section, or around a solitary house, village combat may be practiced so that combat of all types in which the soldier may engage is simulated.

How can a tank be brought to a standstill? By a well-aimed grenade, by a good antitank rifle. True. But above all it needs courage to halt a tank. It takes courage to wait calmly for the steel monster to come within close range, not to take to flight, and not to open fire too early.

To the man whose courage fails him the tank seems to grow to colossal proportions—a giant which overtakes and crushes man. To the man who accepts battle the tank is merely a machine, while he, man, is the king of nature.

Soviet War News quoted in the Infantry Journal

Storage Geared For War

COLONEL HARTWELL M. ELDER, *Quartermaster Corps*
Instructor, Command and General Staff School

THE GLOBAL nature of this war and the great number of troops to be supplied have compelled the army to discard many of the peacetime methods and regulations pertaining to warehousing. During times of peace the emphasis is on storage, with detailed instructions on just how each item should be stored. At the present time, however, the emphasis is on movement or distribution and every effort is being made to have supplies on hand where needed, when needed, and in sufficient quantities to prevent "too little—too late."

Whether in time of peace or when the nation is at war, distribution is a far more important factor than is generally known. Few people realize that of every dollar spent for a finished product, only 41¢ goes into its production, while 59¢ is required for distribution. It costs more to distribute goods than it does to make them. Distribution is not a straight-line process; practically all supplies go into and out of storage from one to three times on the journey from the producer to the consumer or using troops.

The ideal method of supplying an army would be to ship the supplies from the place of production directly to the point of use, eliminating entirely the expense of storage. This is not practical as it is essential to establish reserve stocks and to have supplies available in sufficient quantities within convenient distance of the using troops.

These stocks stored as reserves in our various warehouses compare with the water stored in the large reservoirs of a city water supply system. During periods of irregularity or interruption in production these reserves aid in maintaining the flow of vital supplies to our combat troops, as the water stored in reservoirs provides supply to a city during unusual peak demands or mechanical failures in pumping plants.

The officer charged with the function of storage at depots is the Warehouse Officer. He has a most important job. His responsibilities include receiving, warehousing, and shipping; preparing space layouts, allocating space, and prescribing the type of stacks and the methods of handling. His functions are vital links in the chain of supply, and the success of a depot depends to a great extent on the efficiency of this officer and his organization.

Objectives.—Two objectives must be kept in mind in the operation of warehouses: conservation of storage space and efficient materials handling. As early as May 1942 the Inspector General of the Army realized the necessity for the conservation of storage space and notified the chiefs of the various services in part as follows:

"In the present emergency all available storage space in warehouses in all depots, must be utilized to the fullest extent. Because of this, it has become necessary to deviate markedly from established peacetime conditions which provide for numerous inventory and transportation aisles, perfect alignment of supplies, low height of stacks, and permanent assignment of space to each class of supplies.

"Inspectors General, in their application of the provisions of this section, will be governed by these considerations."¹

A Warehouse Officer should leave nothing undone to achieve this objective. He should be constantly on the alert to observe means of conserving space, and also be receptive to new ideas and constructive suggestions that will improve his materials-handling methods.

Selection and Layout of Space.—The first problem facing a Warehouse Officer is the selection of space for the storage of the various types of supplies. Here are some important factors that must be considered:

1. Machinery and supplies built to stand the weather should be placed in open storage.
2. Commodities having strong odors should not be stored with subsistence stores.
3. Items which usually move together should, if possible, be stored together.
4. The safe carrying capacity of floors. Items of high density should be stored in areas with the highest rated floor-load capacity. Likewise, items of light density should be stored in buildings with high ceilings in order to get a maximum tonnage per square foot of storage space.
5. The rate of turnover of various items, and also the weight or inconvenience in handling of certain items within the warehouse, must be considered. It is good practice to store fast-moving items and items difficult to handle as close to the main aisles and doors as possible.

The next step is the laying out, which should be planned to get the maximum use of the space selected. The details of lay-outs are dependent to a large degree upon the kind and amount of supplies to be stored and upon local warehouse conditions. Each situation presents a different problem that must be worked out locally. Unfortunately, there is no standard all-purpose layout. The nature of the property, the type of building, mechanical equipment

¹ Office of the Inspector General, Inspection Guide No. 6, *Inspection of a Depot*, WD, Washington, 15 May 1942. Sec. VIII, p. 19.

available for handling, and the method of stacking must all be considered in developing the layout plan.

Each section should be laid out with the minimum number of aisles. The main boulevard aisles should be no wider than is necessary for materials-handling equipment to pass with ease. Other aisles should be wide enough to allow equipment to move about singly. Fire aisles should be eliminated wherever expedient.

The Warehouse Manual issued by Headquarters, Army Service Forces, describes several layouts for sections of a warehouse, which have proven practical under certain conditions and can be adapted to fit almost any situation. Figure 1 illustrates customary layouts for sections of a warehouse with two doors on the track side. The aisle arrangement in Sections A and B can be used in any single section, but the layout shown in Section C can be used only in end sections where the elimination of a main aisle would not impede traffic. Note that the main aisles are in alignment through the length of the building. Proper consideration must be given to the mechani-

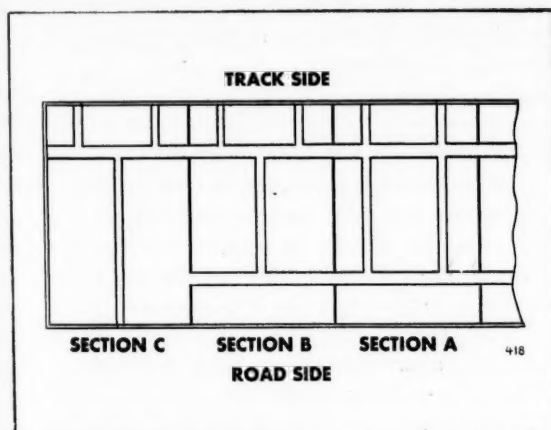


FIGURE 1.

cal equipment to be used before a final decision can be made as to how the space should be allocated. Aisle widths suitable for hand trucks are not adequate for power equipment, and it is false economy to restrict the speed of warehouse equipment through the use of narrow aisles. Speed is the essence of all efficient materials-handling systems.

Methods of Storage.—There are two methods of storing used in army warehousing:

1. Block method: used when the packages are uniform in shape and contain the same quantity of the same item. The packages are arranged in solid blocks.
2. Numeral method: used when packages contain varying quantities of the same item. The markings on each package must face an aisle.

The block method is in more common use at our depots and other large places of storage. Space may be utilized by stacking either at a 90° angle or at a 45° angle to the aisle as shown in Figure 2.

When property is stacked from the wall to an aisle,

90° angle stacking will usually give full utilization of space. However, the aisles must be of sufficient width to allow for the over-all length of the mechanical handling equipment, plus the load. For large center sections in which the minimum aisle widths are de-

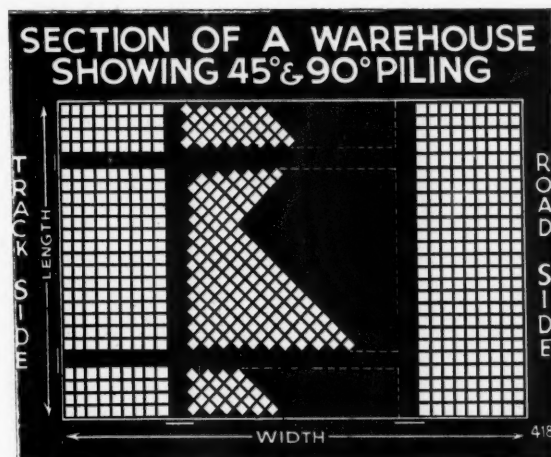


FIGURE 2.

sired, the 45° angle method should be considered. Narrower aisles can be used with the 45° angle since the materials-handling equipment makes only a quarter turn to face the stack.

The probability of "honeycombing" must be kept in mind in allocating space. "Honeycombing" is caused by partial delivery of an item. This leaves open spaces that cannot be filled until the balance of the lot is moved out. To avoid this, effort should be made to keep the rows for the storage of an item as short as possible.

Materials Handling.—Closely associated with space utilization and conservation is materials handling, which involves moving supplies mechanically instead of manhandling them.

Mechanical handling is one of the essential tools used in expediting the storage and shipment of supplies. Work must be simplified, layouts improved, and orders accurately scheduled to attain smoother operation. These are all good ways to boost the flow of supplies, and they will work faster and with surer effect by full utilization of the many types of materials-handling equipment.

Supplies should flow directly and continuously from freight cars or trucks to the ultimate stacks in the warehouse. Time should not be lost by either men or equipment in waiting for some part of the operation to catch up. Labor should be distributed so as to equalize the work.

No one article could cover every one of the countless handling jobs found in army warehousing. The examples of materials handling given are suggestive only. They merely intend to show how better handling methods will improve warehouse operations.

As a general rule, multiple loading—that is, any method which picks up and handles two or more

packages at a time—is superior to handling each package singly. In all warehouse operations, every effort should be made to minimize the number of handlings.

Consideration must be given to the commodities to be handled. For example, case goods can be stacked on pallets in the freight car or truck and then be moved by fork-lift truck directly to the stack and stored without any further manual handling.

What is a *pallet*? According to Webster it is "a bed or mattress made of straw" but in warehousing it is a movable, slatted platform usually about 32 x 40 inches in size, constructed on three two-by-fours or

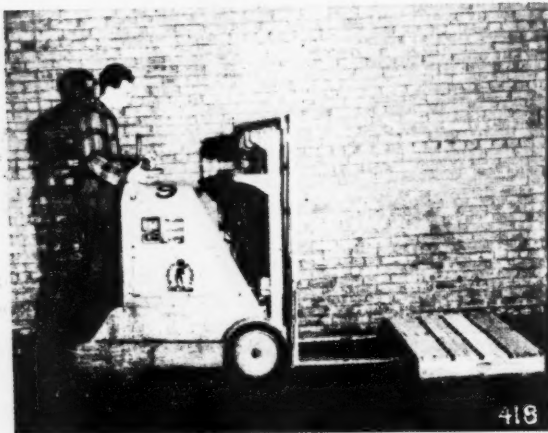


FIGURE 3.

three-by-sixes depending on the forks of the trucks. Figure 3 shows a fork-lift truck and the way the forks are placed under the pallet for lifting the load.

Figure 4 shows a fork-lift truck placing a well-planned pallet load in its place of storage. Note that



FIGURE 4.

all the pallet loads are well stacked, conserving all possible space.

Selecting Equipment.—There are three considerations underlying the selection of materials-handling equipment: (1) the kinds of supplies to be handled, (2) the average length of haul, (3) the average volume of supplies to be moved.

There are four general truck-hauling systems that may be used in warehouse operations:

1. The lift truck-skid system represents the first true power-truck handling system containing within itself a means of picking up, transporting, and setting down without the need of manual or other external handling. When low-lift trucks are used it is possible only to warehouse material in a single tier, losing much valuable space. When a high-lift truck is used it permits the stacking of skids one upon another, thereby taking advantage of overhead space.

2. The fork truck-pallet system provides certain advantages over the lift truck-skid method since pallets do not take up as much space. The fork-lift truck is also capable of handling odd-shaped objects that cannot be placed on skids or pallets.

3. The tractor-trailer system, strictly speaking, is a haulage system rather than a self-contained handling system, since the sole function of the tractor is to supply the motive power and that of the trailer to carry the load. Loading and unloading must be done by hand, by crane, or by fork-lift truck. Consequently, this method finds its major application in the movement of large quantities of material over relatively long distances.

4. The crane truck, of course, is of value in handling large, bulky items which cannot be advantageously picked up and carried by the other systems.

A Warehouse Officer should thoroughly understand all the methods and applications of each system. It may not always be possible for him to obtain the particular type of equipment desired for certain operations, and he must be able to make substitution without impairing efficiency too greatly. This he can do if he familiarizes himself with the various capabilities of each type under actual operating conditions. Through use of proper mechanical equipment, full utilization of cubical capacity by high stacking, and with trained personnel, a Warehouse Officer can greatly increase the daily tonnage capacity of his warehouse operations.

Probably the most important item of mechanical equipment in any warehouse is the fork-lift truck. Its adaptability to meet the handling problems encountered in unloading, transporting, and stacking makes it essential for depots. These trucks are built with various capacities and heights of lifts and have tremendous flexibility. They may be used for handling and warehousing supplies in several different ways, three of which are:

1. **Single-Faced Pallets:** Articles packed in small containers having sufficient high compression strength can be handled on single-faced pallets. These are used in storing such items as kegs of nails, pails of paint, or other items packed in containers sufficiently strong to stand the pressure resting directly on them.

2. **Double-Faced Pallets:** Articles packed in small containers with low compression strength may be

handled on double-faced pallets. This type of pallet protects the crushing of containers by distributing the weight of the load over a large area.

3. *Dunnage*: Articles packed in large containers can be handled by using dunnage of the proper length. The dunnage spaces the units vertically so that the fingers of the fork truck can get between them. Such items as shoes, clothing, bandages, bombs, and gas masks are packed so that this method can be used.

In addition to fork-lift trucks, tractors, and trailers, there are other essential types of equipment that are labor savers in warehouse operations. There are no all-purpose trucks; such equipment as hand-lift trucks for pallets, inclined and vertical stackers, conveyors of various types, cranes, and two-wheel and four-wheel hand trucks, should be considered.

Saving of Man Power.—The purpose of power equipment is to save man power. Modern handling equipment such as fork-lift trucks will cut the labor for unloading a railway car from a crew of seven down to three, two to load the pallets in the car and the third to drive the fork-lift truck. Empty pallets are placed in the car, and when loaded are taken from the car and stacked without the help of additional labor. When the length of the haul is over 150 feet it

is advisable to use tractors and trailers to transport the loaded pallets from the car to the place of storage and use the fork-lift truck to stack the supplies.

Care of Equipment.—Mechanical equipment can function properly only if well cared for. Since this equipment is vital to the efficiency of handling operations, a well-equipped maintenance department should be established to furnish frequent systematic inspections, lubrication, and repairs. Preventive maintenance is most important. Inspections should not be skimmed over as any slighting of mechanical parts or lubrication can lead to expensive repairs.

Training.—Our soldiers are trained in the use of the new weapons of modern war. Likewise we must train men to use the new methods and equipment in our places of storage. Organized training will usually make improvements far beyond the time and effort expended. New men may be taught to perform an operation in a fraction of the time they can learn by trial and error. Old employees also, who may have formed faulty or careless habits, should not be overlooked in the training program.

Supplies that fail to reach the combat troops through inefficient warehouse methods are as useless as if they had not been produced.

A Thought for Instructors

There are a number of wrong ways of asking a question but there is only one right way. Do not, for instance, ask a question in such a way that you give half the answer, leaving the class to supply merely a word. This is a sign of mental laziness in an instructor and it makes for laziness in a class. Again, do not ask questions and allow the class to answer them in unison. The instruction is lost by this method. If you allow the class to answer together it means that a number of them will just make movements with their lips and will not know the answer at all.

Use the right method. State the question clearly, pause, look around the class, pick out someone and put the question to him. During the pause the whole class, not knowing who is to get the question, is thinking of the answer.

—Captain Sean Feehan in *An Cosantóir*.

Discipline

[An extract from "Troop Leadership for Junior Officers" by Lieutenant John H. Thornton, Jr., Coast Artillery Corps. Reprinted from the *Coast Artillery Journal* July-August 1943.]

DISCIPLINE is the life blood of an Army. The degree of success in battle is directly proportionate to the state of discipline of the troops involved. Just as the test of an officer is his ability to get results, so his ability to produce results is dependent entirely on the discipline of his men.

Successful battle discipline stems from self-discipline; pride in organization, instant obedience to orders, vigorous health, all flow from self-discipline, and are founded on the individual soldier's self-respect. Thus, the goal of all officers—to create this self-respect.

Of vital importance to a young officer, however, is the aspect of discipline and its relationship to his dealing with the enlisted men. Success in this regard is more than a mental attitude; it is a technique to be carefully developed and constantly practiced. Junior officers may well take heed that one careless slip in the relationship between them and their enlisted men will invariably undo weeks of painstaking effort to build up discipline.

Certain features in the officer-enlisted man relationship have been carefully worked out by leaders with years of experience. They are well to consider.

a. Treatment of the Soldier by Officers.—First to remember, of course, is that while an officer must adopt a certain paternal attitude toward his men, at the same time he must not forget that they are to be treated as men. That is not to say that enlisted men will not be corrected for infractions of military rules. In fact, they must be corrected immediately. Any young officer who does not have the intestinal fortitude to insist on proper and precise attention to duty from each enlisted man is destroying the respect of that enlisted man toward him. First weeks are all-important. Officers must not be afraid to say "no." Unless this attitude is practiced, before a young officer realizes it, it will be a case of the tail wagging the dog, and his function as a troop commander will have been completely destroyed.

b. A Soldier's Self-Respect.—No aid is so valuable to discipline as an appeal to a soldier's self-respect. It is one of the most prevailing human principles that a man will undertake nearly any dangerous mission to retain his standing in the eyes of his fellow soldiers. In battle, this factor will be needed by an officer, not once, but many times. It is one of the most successful antidotes of all to combat fear. In garrison, this same pride and self-respect must

be carefully nurtured by officers. When appealed to in this manner, most soldiers will react favorably. New officers will find such an appeal the best means with which to deal with first offenders. Nine times out of ten, if an officer will approach punishment with an appeal to self-respect, instead of a sentence in the guardhouse, he will not be troubled with the offender again.

c. Criticism.—One of the common practices of many young officers, whether it be in the club bar or around the mess table, is casual, indiscriminate criticism of higher authority. Invariably such disapproval is transmitted to the men. And it is one of the worst habits which a young officer can develop. Running the War Department from a battery office may be a pleasurable pastime, but it is not conducive to discipline and respect of the troops for their superiors. What most officers do not consider is that when they criticize higher authority they are striking directly at themselves as direct representatives of such higher authority.

d. Punishment.—It is a certainty a young officer will deal out punishment sooner or later. The important factor is the manner in which such punishment is awarded. Perhaps no single item in the commanding of troops is so crucial to a new officer's success as the proper administration of disciplinary measures. The guiding rule for punishment in the Army is to make it *impersonal*. Each man punished by a superior officer must be made to feel that the penalty is a result of an infallible law which is over and above the officer. Just as the famous example of the stomach ache which follows the eating of a green apple, so must a soldier feel about his punishment when he has broken a military law. The smart officer will picture himself as but a mouth-piece for a system of justice much greater than either he or the offending soldier. Justice and promptness are the two administrative rules which all young officers should remember. At the same time, nothing is so damaging to prestige as for a young officer to go off "half-cocked," without examining the facts. He is damaging his standing if he does not investigate each case; be sure of the facts before action is taken; then act fast!

e. Talking to Soldiers.—Young officers must keep constantly in mind that there is a right time, a right place, and a right way to talk to soldiers. They should not be lectured when fatigued. When talked to, enlisted men must be looked in the eye and get it straight from the shoulder. Above all, the enlisted

men are not there to preach to; more damage is done by too much talking on the part of officers to enlisted men than too little. If they are constantly harangued, soon the words of the officer will be meaningless, and when he has something really important to say, it will have the same shade of importance attached to it as the chatter which preceded. The manner of an officer in awarding punishment is calm and dignified. A loud manner and a strident voice have no place in the make-up of a good officer. When he loses control and his reserve is gone, an officer stands pitiful and helpless. The enlisted man has the upper hand. He no longer commands the men; they direct him.

f. Relation of Officers and Men.—The ancient phrase "familiarity breeds contempt" may have an overworked meaning in civilian life, but it is not to be underestimated in the military world. Probably the most common mistake which young American officers make in attempting to lead men is undue familiarity. It is a natural consequence flowing from the democratic process but it rarely produces results on the battlefield. There are, it is true, officers who can treat the men as complete equals and still command their respect and obedience. Un-

fortunately the number of such officers is very small. It is practically nonexistent among junior officers in the present war. In short, officers are forced to maintain a reserve between themselves and their enlisted men for their own self-preservation. It is difficult to judge the exact amount of such reserve which will produce the best results, but a certain amount of aloofness has always to be maintained. The distinction is not based on social barrier or any particular mental achievement, but is completely necessary for the preservation of discipline. Officers must remember that no matter how intelligent or entertaining their enlisted men might be, they must not treat them the same way as they do fellow officers. The entire careers of young officers hinge on the confidence and respect of their men. No matter how careful they are, this respect will be undermined unless a reserve is maintained. Again, it is not a social question but rather a life-saving measure for the preservation of discipline. When a junior officer gives an order it must receive instant obedience. A front line gun emplacement is not the place for a jolly discussion between pals. This practice may be unpleasant for a young officer to remember, but the terrible toll exacted when discipline fails is too high to ignore.

The Need For Jungle Training in Burma

[From an article in *The Statesman*, Delhi, India, 12 May 1943.]

IN CONSIDERING the various factors that have led to the disappointing results in the Arakan [a division of western Burma adjoining India] one must be brought into sharp prominence—the question of proper training for our troops in jungle warfare.

It is now established that so far as strength in men and material was concerned we were in a good position. Again and again, however, we read of the enemy infiltrating through our lines, and this makes it only too evident that the British and Indian troops were not sufficiently well versed in jungle warfare to cope with such tactics. On the occasions when there have been direct frontal attacks our men have not been lacking in courage; but, when it has come to dealing with the intricacies of jungle warfare in tackling an enemy lightly equipped so that he can make a stealthy approach, we have failed. In these circumstances it has been impossible for the British and Indians to use their superior numbers and equipment to the best advantage; rather, they may have been encumbered by them.

It is essential that our troops be given very strict training in close jungle fighting, so that they can work as small units and travel and fight as lightly as possible. Such training and not numerical superiority or superior equipment will count, and too great store should not be laid on the successful conclusion of the Tunisian campaign, for fresh reinforcements, no matter how seasoned in warfare they might be, will not be of immediate use in this theater of war, not until they themselves have been carefully trained in the new type of warfare. Rather will it be necessary for us to depend on those troops who have already seen service in the Arakan and those who are at present in training. On the Mayu peninsula [in the Arakan], to a great extent, the troops used were raw and totally inexperienced in the type of fighting—a result of the vast expansion in the armed forces in India during the past year. There was much good potential material among them, but they were asked to fight too soon.

Private Marco Antonio, Prisoner of War

MAJOR B. E. PRESCOTT, *Infantry*

and

MAJOR H. H. KILPATRICK, *Infantry*

Instructors, Command and General Staff School

OUR MISSION is to follow an Italian soldier from the time of his capture, through all his experiences and contacts with the American Army as a prisoner of war, to his arrival at an internment camp in the United States.

Prisoners of war come under a specific and detailed code as rigid as the Articles of War: namely, the Geneva Convention of 1929 relative to the treatment of prisoners of war, to which the United States is a signatory. They must at all times be humanely treated and protected, particularly against acts of violence. Measures of reprisal are prohibited.

The Italian 206th Coastal Division carries on its roster the name of Private Marco Antonio. Marco Antonio was born in the city of Naples and grew up under the Fascist system. He has had the equivalent of our grammar school education and in civilian life was a farmer. His pre-military training began at the age of six when he became a member of the *Figli della Lupa* (Children of the Wolf), and his preparation for military service continued until he was conscripted for service with the colors in 1940 at the age of eighteen. He saw service in North Africa for two years, was awarded the *Valor Militare* medal for exceptionally meritorious service, was wounded and evacuated to Italy. After recovering from his wounds, he was assigned to his present division, a newly organized Coastal Division.

At dawn on D-day Private Antonio, with one officer, three sergeants, and ten privates, was a member of a patrol operating about five miles south of the city of Vinetra. The patrol was on a reconnaissance mission attempting to locate the extent of the American advance. Bombardment by air and from the American "Long Toms" had been almost continuous for forty-eight hours. Suddenly, as the patrol was moving through a vineyard, they were fired upon from two sides. After a brief exchange of shots the *Tenente*, the Lieutenant commanding the patrol, realizing that the patrol had been ambushed, raised his handkerchief on a stick in surrender.

A voice in the northern Italian dialect shouted, "Come out with your hands up!" The patrol dropped their weapons and, with the exception of two men who had been wounded, walked out of the vineyard with their hands raised. As they approached the Americans, a tall sergeant walked up to Private Antonio and hastily searched him from his helmet to his boots. He was allowed to retain his identification tag, gas mask, medal, money, and other valu-

ables. His diary, two letters from home, a magazine, and his Soldier's Record Book were taken from him. Two of the guards who were detailed to escort the prisoners then placed the documents in a separate sack which carried, in addition to the prisoner's name and serial number, a record of time, place, circumstances, and unit effecting capture.

As soon as the search was completed, the American Lieutenant, through one of his men who spoke Italian, ordered the prisoners segregated into three groups as follows: the officer, the three noncommissioned officers, and the eleven privates including Antonio. They were informed that there would be no talking nor any communication between them and that any one attempting escape would be shot.

Four questions were asked Antonio: What is your unit? Are there any more of you in this patrol? Where are your front lines? Are there any machine guns around here? Having answered these questions Antonio was then directed to assist in carrying the two wounded prisoners in improvised litters.

Less than ten minutes had elapsed from the time of capture until the prisoners were on their way to the rear with one guard leading the group, one on each side, and one following. Speed in evacuation is essential in order to prevent recapture by the enemy and to get prisoners before qualified interrogators as soon as possible after capture. Experience has shown that volubility or a desire to talk accompanies release from action. Therefore prisoners must be interrogated before the strain of battle and shock of capture has had an opportunity to wear off. The arrangements made by the American patrol leader effecting the capture were made for the purpose of taking advantage of this temporary condition. The two stretcher cases moved through the regular medical evacuation system to aid station, to collecting point, to clearing station. The officer prisoner was rushed back by jeep to the division collecting point for immediate interrogation.

Private Antonio and the remainder of the prisoners marched back through the company, battalion, and regimental collecting points, never remaining longer than fifteen minutes at any one place. More thorough searches were made and a few questions were asked him pertaining to the immediate tactical situation on the front of the units involved.

A few minutes after arriving at the division collecting point, Antonio was led by a guard into a bare room in an old farm house. There was but one

officer in the room, with a large-scale map of the Vinetra area on the wall beside him.

Now a word about the officer conducting the interrogation. He is a member of an interrogation team, consisting of two officers and four noncommissioned officers, which had been attached to the 196th Division upon its arrival in the theater of operations. He speaks the Italian language fluently, knows Italian military abbreviations and conventional signs, and is qualified to read and interpret enemy operation maps. He has an up-to-the-minute knowledge of Italian organization and tactics. He knows the national psychology and the different racial groups in Italy. He has studied the art of interrogation. During the course of the interview, the officer will take no notes. He has installed a dictaphone in the room, and another member of the team is in an adjoining room recording the conversation. Before Private Antonio was brought before him, this officer had thoroughly familiarized himself with the contents of the diary, the two letters from home, and the Record Book taken from the prisoner and immediately forwarded by the patrol making the capture. From these documents the interrogator has developed a plan for questioning this prisoner based upon his characteristics, background, and duties. He must find the key to make the prisoner talk. His questions will develop indications rather than conclusions. In most instances he will stay away from leading questions which may be answered by "yes" or "no," questions which by their wording suggest the answer, or questions which assume the existence of an essential fact which has not yet been established. He must know what he expects to get out of a particular prisoner and is assisted in this by close liaison at all times with the division G-2.

Private Antonio, having saluted the American officer interrogator, was told to sit down. He was then offered a cigarette and a cup of coffee which helped to clear his mind. He was first asked about his *Valor Militaire* medal and about the details of the engagement for which it was awarded. Being proud of his accomplishment, he was not at all hesitant in describing his actions for which he was decorated. Much to his surprise he was then asked about his family in Naples and his farm, information gleaned from his diary and letters from his home. The conversation then developed into a discussion of the employment of the prisoner's unit. The interrogator pointed out to him on the map some of the known locations of Italian heavy weapons and criticized the Italian commander adversely for not placing guns at other points where the interrogator suspected guns to be located. In giving the prisoner the impression that the questioning was a professional discussion rather than a search for information, maximum use was made of such definite information as had been received. In this manner the interrogator gradually developed bits of information on the strength of the

enemy's front line, the location of reserves, a contemplated hostile withdrawal, enemy morale, and conditions within the city of Vinetra.

At the conclusion of the interview, Antonio was taken back to rejoin the other members of the patrol. Here he was cautioned by one of his sergeants about secrecy discipline and told to destroy all personal papers. It was too late.

The reactions of a prisoner, both voluntary and involuntary, have been found to depend to a marked degree on the routine procedure used in his handling. In other words, the value of a prisoner as a source of information can be enhanced by proper handling.

At the division collecting point the combat troops are relieved from further responsibility for prisoners. It is here that the Military Police take over.

The division G-1, as the general staff officer responsible for the handling of prisoners of war, and the Provost Marshal, as the operating head of the Military Police, picked the division collecting point. Factors of concealment and protection from fire were taken into account in the selection. Of greater importance was the need of the regiments for having ready access to the collecting point. The point selected was therefore centrally located to all units. It was near the route over which most of the empty supply vehicles would pass in going to the rear. For speedy evacuation these empty vehicles can be put to good use with proper planning.

The regiments were informed of the location by fragmentary order. They cleared out their collecting points by detailing guards from the various groups that had brought prisoners back from the battalions, moved the prisoners to a point where they could be entrucked, and then sent them to the division collecting point.

When the patrol of which Private Antonio was a member arrived at the division collecting point they found some 200 other prisoners. Antonio noted that one of the guards that had come back with his group was told to remain and assist the military police. He saw only a dozen soldiers wearing MP brassards and correctly surmised that they were being augmented by combat troops as the number of prisoners increased.

With the assistance of the guard a tag was made out and the loop of string on it was slipped over Antonio's head. The tag showed the place and date of his capture and that the 488th Infantry had taken him.

After the interview with the interrogator, already described, two of the non-coms who had been with his patrol came back to the group. A guard came with them. The senior non-com said that all the prisoners were being divided up and that he was going to be in charge of the prisoners from the 618th Infantry (Italian). He commenced writing out a list of all

the men in the group. When this was done the guard had him tell the prisoners that they were going to the rear, that in case of an air attack on the way back they were to lie down and stay down until the order to resume the march was given.

Soon the prisoners from the collecting point were on the road. About fifteen guards marched on the flanks of the column, a truck followed hauling the wounded who were unable to walk, and a jeep with mounted machine gun brought up the rear. After a three-hour march the detachment arrived at the division railhead. Here a new group of MP's exchanged greetings with the guards who had shepherded the march. A roster of the prisoners was turned over to the officer who commanded the new guard detachment. As in previous encounters, there was no fraternization between prisoners and guards. The latter were cold and businesslike. After a count, and time to fill their canteens, the officer ordered the prisoners loaded into some empty freight cars standing on a siding. A box was handed each man as he climbed aboard. Their non-com told the group that it was a ration and that it would have to last them until the following day.

Antonio and his group were not as lucky as some of the other prisoners on the army front. In other divisions, where the railheads were far in rear of the front lines, army supply trucks had been moved up to a rendezvous point and were evacuating the prisoners. In all cases, however, army MP's were handling the evacuation from division. The arrangements for the movement were worked out by the division and army G-1.

Antonio noted that all the officers were being loaded into a separate car. He anxiously looked over the faces to find that of his *Tenente*, but he could not recognize him. He would have been interested to know that the *Tenente* was at that moment enjoying wine and a fine cigar in the office of the corps G-2. The *Tenente*, who liked to brag, had given the information at division that he had just returned from northern Italy where he had been on leave. Shortly thereafter he and two high ranking officers who had just been captured had been blindfolded and taken by special car for a chat with the corps G-2.

Shortly after dark the cars at the 196th Division railhead were hooked onto a train which was headed south. Sometime the next morning the train stopped, and soon guards opened the doors of the cars. Orders to detrain were given, and their own non-com lined them up.

To the west Antonio could see a town. It was in that direction that the column, four abreast, now proceeded. No longer, however, was it composed of a mere 200 prisoners. It had been augmented at other railheads until now it consisted of some 900 prisoners. He wondered if there was food for so many where they were going.

Soon the column approached the remnants of a town; a sign, scarred and rusty but still legible, hailed *Il Duce* and said that they were approaching Arqualfi. Barbed wire was stretched around the town, and there were sentry boxes every 700 meters. The town had evidently been evacuated so that it could be used as the army enclosure.

After they had passed through the gate, a non-com said: "These guys are so lousy we better give them a bath before we process them." The prisoners were marched to a tent near the river where they were told to strip and put their clothes into bags. The tag which had been put around each man's neck at the division was now fastened to his bag. Some protested that they wanted to keep their own uniforms, and they were told that they would get them back as soon as they had been fumigated. Each piece of clothing was carefully searched. It was evident from the growing pile of papers that much had been missed in the search at the divisions.

Antonio joined a line which moved slowly up some stairs and into a shower. In four minutes he was pushed on and a soldier sprayed the hairy parts of his body with some disinfectant. He then received his bag, which he identified by the tag, shook his clothes out, and dressed.

Again the group was lined up and ordered to move to a building in front of which was a sign:

106th PRISONER OF WAR PROCESSING COMPANY
ATTENTION
PRISONERS OF WAR
PROCEED FROM SECTION TO SECTION
WITHOUT CONVERSATION
ANSWER ALL QUESTIONS PROMPTLY AND
CONCISELY

In this building Antonio was weighed, fingerprinted and photographed, and given an internment serial number. The name of his wife and her address, and his civilian occupation all were taken down. Three copies of the form on which this information was recorded was made out. If Antonio could have had explained to him what this form was, he would have learned that it was PMG (Provost Marshal General) Form No. 2, that one would go with him wherever he went, another would go to the Prisoner of War Information Bureau so that his family might be notified, and one would remain at the enclosure.

That night everyone in the enclosure was ordered to prepare to move. The rumor was that some prisoners were going to be evacuated to the United States and some to labor camps in the Communications Zone. Antonio's group was marched to a train, and after a ride of two days, broken only by short periods for exercise, they arrived at a large port.

The trainload was divided into groups of three hundred, then loaded into lighters and taken out to ships waiting in the harbor. There a new guard took over, counted the prisoners, and checked the records. As the guards lined up at the rail to see their charges

come aboard, Antonio noted that there were thirty of them. He was told later that they were a Provisional PW Escort Detachment, specially employed to ride cargo vessels and handle prisoners on the return trip.

As the prisoners came aboard they were handed life belts and blankets and then ordered into the hold amidships. Soon their sergeant appeared and told them the instructions he had received. No lights, no noise at any time. As long as they obeyed, the hatch would be left open and they would be allowed on deck once a day for a salt water bath and exercise. After a voyage of several weeks the convoy arrived in a great harbor crowded with ships. The following morning the prisoners were put to work cleaning the hold in which they had lived, and when that was completed they moved on deck with their blankets and life preservers. The sergeant said that the officer in charge had told him that they would disembark at 0800, and that a new guard would take over.

Promptly at that hour a small steamer nosed alongside the freighter. Each Italian non-com checked his own group, and the senior non-com informed the guard officer that all were on deck. As they filed over the gang plank placed between the ships, the officer taking charge of the prisoners counted them. When all were aboard, the count verified, and the records turned over, the steamer cast off and moved to a quay some two miles away.

When the order came to disembark this time, these members of the Italian Army would set foot on American soil; but how different their coming from that which had been contemplated! Through a line of guards they were marched into a large warehouse. In it was located a fumigation and shower unit. After being stripped, searched, and bathed, the prisoners again were dressed and marched to another ferry. This time they were carried to a railroad terminal.

Upon being marched from the ferry a new set of guards was prepared to take over. They divided the

prisoners into groups of 50 per car with at least one Italian non-com to each group. The prisoners were then ordered to board the train. Antonio looked about curiously to find a clue to his future treatment. The car was an old coach, but it was far finer than anything in which he had ever ridden.

There were about 500 aboard, and Antonio had noted two kitchen cars as he marched down the side of the train. At 1200, four hours after coming down the freighter's side, the train pulled out on its way to the interior of the United States.

No justified complaint could be made that the rules of land warfare were not being observed with respect to the treatment that the prisoners had received. For example, the Geneva Convention provides that prisoners shall have the same accommodations in transit as the troops of the capturing power. Actually the train was not as crowded as it would have been had it been carrying our own troops.

After a ride of several days the train pulled into a siding at a Prisoner of War Internment Camp. Antonio was now safely in custody for the duration. As he was a farmer, he would probably be required to work in the fields of our western farms. Some of his companions would repair shoes and clothing or operate quartermaster laundries. He and his fellow prisoners would be nearly self-sustaining and in addition would take over many tasks which would free civilians for more important work.

If their conduct is soldierly, each prisoner will have to his credit at the termination of hostilities eighty cents for every day of labor performed. If they choose to disobey orders or refuse to work they will be tried under the Manual for Courts Martial which governs our own soldiers. Their non-coms will maintain discipline in the camp. Their guards will be ever watchful but never malevolent.

All units and persons mentioned in this article are fictitious.

War means fighting. The business of the soldier is to fight. Armies are not called out to dig trenches, to throw up breastworks, to live in camps, but to find the enemy and strike him; to invade his country, and do him all possible damage in the shortest possible time. This will involve great destruction of life and property while it lasts; but such a war will of necessity be of brief continuance, and so would be an economy of life and property in the end.

—Stonewall Jackson

Training Literature—Distribution and Utilization

From *Conference Notes on Training Doctrine* prepared under the direction of Director of Training Headquarters, Army Service Forces.

THE TRAINING doctrine of our army is enunciated and promulgated through the medium of its training literature. We have standardized on three types of training literature—the Field Manual, the Technical Manual, and the Training Circular.

The Field Manual is primarily the manual for the enunciation of doctrine. The Technical Manual is intended primarily for the dissemination of specific technique or procedure. Doctrine, being a set of beliefs, is almost always controversial. Technique usually is not controversial. For example, there are probably as many opinions as there are officers, as to the degree of protection to be furnished service troops and as to who will furnish that protection; but there are very few different opinions as to how to run a cleaning patch through a rifle.

Although Technical Manuals in general do not contain doctrine in the strict sense of the word, the War Department prefers to include their contents under the broad term "Doctrine." This is because it is practically impossible to make a clean-cut division between doctrine and technique or operational procedure.

A third method of providing training doctrine or technique is the Training Circular. This is a hurry-up method of enunciating doctrine or technique until such enunciation is eventually absorbed into the Field Manuals or Technical Manuals concerned.

RESPONSIBILITY FOR THE PREPARATION OF TRAINING LITERATURE.

Under the present organization of the War Department, the responsibility for the preparation of manuals is divided as follows:

Army Ground Forces.—The Army Ground Forces are responsible for initiating, preparing, and approving that training literature which concerns the tactics and technique of the various arms. The actual preparation is usually done at the service schools of the various arms.

Army Air Forces.—The Army Air Forces are responsible for that training literature which concerns all matters that are primarily Air Force in interest. The actual preparation is usually accomplished at the Air Forces School for Applied Tactics, and similar establishments.

Army Service Forces.—The Army Service Forces are responsible for initiating, preparing, and approving the doctrine of the employment of service troops, and the many technical manuals which impart the technique of the use, care, and maintenance

of the items of equipment furnished by the ASF to the army as a whole. The actual preparation is the responsibility of the supply service concerned.

Coordination.—In those cases where there is an overlap of interest between two or more of these major commands, coordination is secured by obtaining concurrences. This coordination is normally accomplished at the level of the three major headquarters.

The War Department General Staff.—The War Department General Staff is responsible for the basic doctrine of the United States Army which is found in the Field Manuals of the 100-series (otherwise known as the Field Service Regulations); for FM 21-5, entitled "Military Training"; and for those field manuals conveying doctrine on military intelligence. The War Department General Staff also settles disagreements on doctrine between the Ground Forces, Air Forces, and Army Service Forces.

PUBLICATION

The large majority of War Department manuals, when approved as has just been described, are forwarded to the Adjutant General for publication. The Adjutant General first carefully edits the manual for the many minor mechanical errors that are contained in most manuscripts. The Adjutant General, however, has no jurisdiction over the doctrine or intent of the manuscript. The editing takes from a few days up to about two weeks. After editing, the Adjutant General forwards the manuscript to the Government Printing Office for the actual printing or the procurement of printing. The manuscript is accompanied by an order for a definite quantity of copies. This number is computed by the Adjutant General. He arrives at this figure as follows:

The agency primarily responsible for preparing and approving a manuscript submits to the Adjutant General, with the manuscript, a brief statement as to the type of organizations to which the manual should be distributed, and the number of copies which each type of organization should receive. The Adjutant General applies this figure against the estimated future strength of the army as taken from the troop basis. This gives him the total initial distribution. He then adds a factor which amounts to the sum total of the desirable level of stockage in the field depots after the initial distribution is made. These figures, added together, give the total which is ordered from the Government Printing Office.

That the Government Printing Office is a big fac-

tor in the publication of manuals is understood by very few people in the army. Criticisms are frequently voiced as to the style of printing, the grade of paper, the size of illustrations, and so on. All such matters are governed by the policies set by the Government Printing Office. The War Department can only request or recommend, it cannot demand.

Many of you are probably asking who runs the Government Printing Office. The Government Printing Office is a direct subordinate agency of the Congress of the United States. It is a large printing establishment whose Board of Governors, so to speak, is the Joint Committee of Congress for Printing and Binding. This Joint Committee, as its name implies, consists of members of both houses of Congress. We thus find that we are dealing, not with another bureau of the executive branch of our government, but with the legislative branch.

The Government Printing Office either prints the manuals itself, or else goes out on the market and contracts for the printing.

There are several other methods of obtaining the printing of War Department manuals. They are exceptions to the rule, however, and need not be described in this discussion.

DISTRIBUTION

Let us start with the approved and edited manuscript. An order for printing is initiated by the Adjutant General and sent to the Government Printing Office. The Government Printing Office then either prints the manual itself or arranges a contract with some commercial printer. The printed manuals are then sent directly to the Adjutant General's warehouses. There is one warehouse or depot at each service command, at each port of embarkation, in the Military District of Washington, and in the War Department itself. Initial distribution begins promptly. The warehouses in Washington distribute to the interested agencies of the War Department, including the Air Forces, Ground Forces, Headquarters, Army Service Forces, and the Administrative and Supply Services of the Army Service Forces. The Adjutant General depots in the various service commands distribute automatically to each post, camp, and station. Here the Post Adjutant maintains or should maintain a library or small depot. The Post Adjutant distributes from this library to the various organizations, units, and headquarters at his station. The ports of embarkation are responsible for the distribution of manuals in the various overseas commands.

All of this distribution to existing organizations is automatic except in the case of the ports of embarkation. Each theater commander has his own say as to the extent and nature of the distribution of manuals to his theater.

How is this automatic distribution effected? It was mentioned earlier that the approving authority

forwarded to the Adjutant General, with the manuscript, a statement as to the desired distribution. This distribution is published on the fly-leaf of the manual just under the War Department authentication. It will read something like this:

Distribution:

D 17(5) (meaning—to headquarters of each armored division, 5 copies)

R 17(8) (meaning—to the headquarters of each armored regiment, 8 copies)

1 Bn 9(2) (meaning—to the headquarters of each interested Ordnance battalion, 2 copies)

Bn 17, 18(5) (meaning—to the headquarters of each armored or tank destroyer battalion, 5 copies)

C 17, 18(5) (meaning—to each armored and tank destroyer company, 5 copies)

1 C 9(3) (meaning—to each interested Ordnance company, 3 copies).

Guided by this, the service command depot distributes to each post the total quantity of copies needed to distribute the prescribed number of copies to each organization on that post that is described on the fly-leaf of the manual.

Schools and other training establishments are on a routine distribution of all manuals.

Any organization may request a manual or any number of manuals. The distribution described on the fly-leaf is only an initial distribution. It is not the distribution. There is no regulation which states that an organization which is not described on the fly-leaf of a manual may not requisition copies of that manual. Neither is there any regulation which prevents an organization that has received the stated number of manuals from requisitioning additional manuals. These requisitions are passed up through command channels, which are the same channels in reverse as are used for the automatic distribution of manuals. Of course the intervening commanders, particularly the immediate superior headquarters of the requisitioning organization, should scrutinize the requisition to make sure that there is no obvious waste, or that officers are not trying to build up large personal libraries for their own quarters. *In no case does a service command, or any other echelon in the chain, disapprove a requisition on the basis that the fly-leaf of the desired manual does not authorize the filling of the requisition.* No such interpretation should be placed on the distribution stated on the fly-leaf.

It must be emphasized that the desire of the War Department is that instructional literature will reach every organization that can derive any benefit from it. The distribution as stated on the fly-leaf is at best a War Department guess as to the proper distribution. As a guess, it can be wrong and frequently is. Any error made in the War Department in prescribing a distribution should in no manner prejudice the right of an organization to secure manuals that it needs.

Distribution to Newly Activated Organizations.—Newly activated divisions receive just prior to the date of activation an automatic bulk initial distribution of manuals in quantities computed from the respective fly-leaves. The division commander breaks up the bulk shipment and makes distribution, again according to the fly-leaf, to the various organizations of the division.

THE RESPONSIBILITY OF THE SERVICE COMMAND IN DISTRIBUTION

Although this has been described, its importance in the chain from the author of the manual to the user is such that it might be well to dwell on it a little longer. Individual officers in the Office of the Director of Training are constantly beset by requests from friends in the field begging for copies of manuals. These requests are heartbreaking for two reasons. We are all acutely sympathetic with the officer who is trying to organize a raw unit into an outfit that will perform overseas. We hate to see him frustrated. Furthermore, it is rather discouraging to think of all the effort that has gone into the preparation of manuals only to suspect that these manuals are carefully stored away in depots.

It is usually difficult for us to determine who is at fault. Sometimes it is a clerk or junior officer somewhere in the chain of supplies who is cursed with a hoarding instinct. In most cases we suspect it is ignorance on the part of the organization commander concerned. He either does not know where and how to find out to what manuals his organization is entitled, or else he is ignorant of the method of requisitioning.

Regardless of who is to blame, we feel that the condition can be corrected by the training divisions of the service commands. By frequent inspections of all posts, camps, and stations under their jurisdiction, they can locate failures in the system. They can educate either the supply personnel involved, or the unit organization commanders involved, or both, to the end that manuals reach the organizations.

TRAINING LITERATURE LIBRARY

The Director of Training has found it very helpful to have in his office a complete "master" library of training literature, contained in cabinets. We recommend that each school and training center and each post and division headquarters maintain a similar library. This library is a very convenient reference. You will probably find that you must keep it under lock and key. It is separate from the library of issue which should be kept at each post, camp, station, and training establishment. This master library is very helpful in determining whether or not a manual not automatically issued to an organization is useful to that organization and should be requested by them.

LIST OF PUBLICATIONS FOR TRAINING: FM 21-6

The business of providing training publications is a mail-order business. No mail-order house would do

much business if it did not provide a catalog. The War Department has such a catalog. It is known as Field Manual 21-6. Its title is *List of Publications for Training*. It is given the widest distribution. It is published every six months and is kept up to date by frequent issues of training circulars which list the publications that have been issued since the printing of the last catalog, or since the publication of the last such training circular. This book is extremely valuable. *No service school can consider that it has fully done its job if it ever permits an officer to leave it without knowing FM 21-6, and how to use it.*

Similarly, the Director of Training of each service command should make frequent inspections of all posts, camps, stations, and training establishments in the service command to insure that each organization commander has copies of the latest edition of FM 21-6; that these copies are carefully maintained up to date by the incorporation of the information contained in the amending training circulars; and finally, that the organization commander and all his officers are thoroughly familiar with the manual and how to use it in insuring for their organization the benefit of approved War Department training literature.

UTILIZATION

The utilization of this training literature depends on several factors. These are availability, quality, proper planning in training, and the advance study by instructors as a part of such proper planning. All four of these factors are important. However, and it may seem strange to you at first, in my opinion the factor of quality is the least important of the four. If a manual is only fair in quality the determined officer or the soldier will get some benefit out of it. If it is not available he gets none. If schedules are improperly planned so that there is no opportunity to study a manual before the training is undertaken, absolutely no benefit is obtained. Finally, if instructors are too lazy to study manuals before undertaking instruction, the best manuals in the world produce absolutely no benefit.

Let us discuss each of these factors in turn. In spite of what I have just said about quality, the War Department and all preparing agencies have been endeavoring to raise the standard of training literature. If any one doubts that there has been any improvement, he need only select at random about a dozen manuals ranging from the oldest to the newest in date. The improvement is very obvious.

The chief element affecting quality in our headquarters is the matter of time. We permit many minor imperfections and errors to go to press because we operate on the assumption, as stated before, that a fair manual is better than no manual.

Our next concern is availability. Availability is partly the responsibility of the War Department. We have just pointed out that our headquarters will approve and send to press a manual that is not perfect,

in order to make sure that it is available. Our headquarters has also taken the steps necessary to assure that the catalog FM 21-6 is kept up to date. Training circulars will be issued monthly, listing the latest publications. If you insure that this information is transcribed into your FM 21-6, it will remain up to date.

In short, we help availability by providing a good catalog. From this point on the responsibility is yours. You in the service commands must make sure that the Adjutant General depots are effecting their distribution to posts, camps, and stations; that each post, camp, and station is effecting distribution to troops and is not hoarding the manuals in depots; that organization commanders have copies of FM 21-6; that they keep them up to date; and that they check their libraries to make sure that they have every manual to which they are entitled. You representatives of the chiefs of the services can assist in making manuals available by speeding up their preparation and by making sure that your training establishments indoctrinate both their students and instructors in the use of manuals and in the use of FM 21-6.

Before I leave the subject of availability, let me cite a "horrible example." Recently an officer in the War Department reported that while on an extended inspection trip he went through many company kitchens. He did not find a single copy of TM 10-405, *The Army Cook*, in any kitchen, or accessible to the cooks. All copies of manual were in each case held in the permanent files of the company.

The distribution of this particular manual is five copies to each company. Certainly two or more copies should be in the hands of the mess personnel. This is the sort of thing that must be corrected by the proper education of officers both at schools and in the field.

As I have said before, the publication of the manual in quantities as high as hundreds of thousands, and the availability in company orderly rooms is of absolutely no value if training programs are not properly planned in advance. We believe that we have whipped this problem insofar as the schedules contained in MTP's go. However, after the period of MTP's, the organization commander is on his own.

Now let us discuss the manner of using War Department training literature. These manuals are intended for use both as text books and as references. They are not intended as media of entertainment. There is a school of thought in our army which believes that a manual should be capable of being picked up and read like a novel. Who remembers what was in a novel that he read three months ago? We want the soldier and officer on the battlefield to carry out what was in his manual. For the vast majority of beings, knowledge which is retained is a result not of entertainment but of hard work on the part of the person concerned. "There is no royal road to knowledge."

In the first place, most manuals, particularly the field manuals (other than the Soldier's Handbook), are not intended for the private soldier. While there is no objection to their being studied by the private soldier, and while he should be encouraged to study them, we must remember that it is fundamental in our army that training is imparted by junior officers and NCO's. It is these men who must study the manuals. I did not say "read." These manuals must be studied, which means that they must be read, reread, and reread again. These leaders must master each phase of the next day's instruction by intensive study of the training literature concerned, and having imparted their knowledge they must go back and check up on weak points or on new aspects that cropped up during the period of instruction or as a result of further thought. The officer before going out on a maneuver should have already studied to his satisfaction the matter of, let's say, combat fire. Should he have to deploy his men in the course of maneuvers and engage in a fire fight, he should at some subsequent time have several points in his mind that he wants to check up on. The process thus is study, execution, cogitation, perhaps discussion or even argument, and then a reference to the manual. In short, the purpose of a field manual is to cause the officer to think.

The *technical* manual is most often a set of directions, such as a mail-order company will send with a knocked-down porch swing. Like these directions, they should be used right in conjunction with the matériel they describe. The officer who will *next week* instruct recruits in the field stripping and cleaning of the M1 rifle should this week retire to a quiet corner with the rifle, the tools, and the book. The repair mechanic should do likewise, and during future repair jobs, he should have the manual in his coveralls. The student mechanic should have access to the manual before, during, and after classes.

CHANGES AND TRAINING CIRCULARS

Manuals are kept up to date by the medium of formal changes and of the less formal Training Circulars. Changes are printed by the Government Printing Office as separate jobs, and require several months to get out. There is a standing contract for Training Circulars. These are published in less than five days.

An error in a specific manual is corrected by the medium of the change. If the information is urgently needed in the field, it is also put out in a Training Circular, which will precede the change by many weeks.

New doctrines or new information is disseminated by Training Circulars.

We in the War Department are surprised at the lack of suggestions from the field as to needed changes in existing training literature. These changes are eagerly read when submitted from below. Our headquarters is anxious to receive more of

them: All of you could do the army a favor by convincing the field that any suggestions they have as to corrections in manuals should be submitted promptly through channels. Any diffidence on their part should be overcome. No one ever got reprimanded, to my knowledge, for recommending a change in a manual. Let us have more of them.

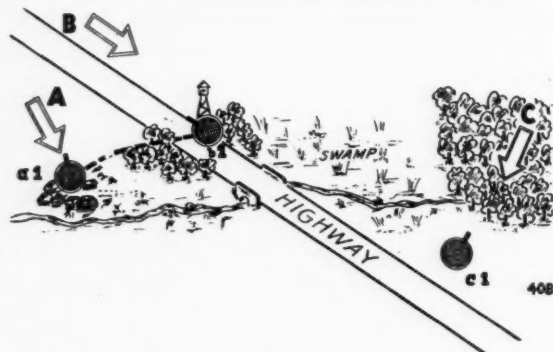
SUMMARY

In conclusion I should like to leave the following points with you.

1. FM 21-6 should be treasured, used, and kept up to date.
2. Everyone connected with the distribution of manuals should make sure that they are moving downward.
3. Manuals should be used in connection with actual training periods. Apply freely, before, during, and after.
4. We want to get more suggestions from the field.

Strongpoints

In place of the continuous lines that characterized the battle fronts in World War I, the present war has witnessed the increasing use of "strongpoints," especially in the Russian theater where there is frequently no front "line" at all. The accompanying sketch shows the layout of one such German strongpoint, a description of which is given in the *Hamburger Illustrierte* for 12 May 1943 as follows:



In the area in which this strongpoint is located, there are three directions, indicated by the arrows, from which the enemy may attack: A, across the open country north and northwest of the village; B, along the highway from the northwest; and C, through the woods which come close enough to the highway to provide cover for effective flanking movements. The swampy ground between B and C is not passable at any season for attacking troops. Effective protection for this area has been developed by the Germans through the erection of three defensive positions which together constitute the strongpoint.

The most important center of defense is at the village (a-1) where troops are quartered with heavy machine-gun positions covering the open country to the north and northwest, and with field

artillery able to break up at a distance any enemy concentrations that may threaten an attack.

On the highway (b-1) antitank guns are placed to prevent the approach of enemy armor. A rise in the road to the northwest cuts off the view from this point and therefore a high watchtower has been erected which commands the country for miles in all directions. At c-1 rifle troops are located to keep watch on the neighboring forest. All these centers work in close cooperation through telephone connections.

Patrols are constantly maintained in the surrounding areas to prevent surprise by concentrations of guerrilla bands or Soviet troops. Scouting parties operate at all times between the village (a-1) and the highway (b-1), keeping watch on the open country and on the dangerous patch of woodland that skirts the road. From the position on the highway (b-1), motorcycle troops make frequent trips up and down the road, not only to prevent surprise but also to harass the enemy in the distance. From the third position (c-1), rifle troops take turns in scouring the forest to discover any enemy forces lurking there. Thus it is difficult to assemble sufficient forces anywhere in the area for an effective surprise attack on the strongpoint, and artillery, machine guns, antitank guns, and small arms are readily available to concentrate quickly for the repulse of an attack from any of the directions in which the strongpoint is vulnerable.

By means of a series of such strategically located strongpoints as this, the Germans have found it possible to block off large areas from enemy attack, according to the *Hamburger Illustrierte*, and they can do this without massing large bodies of troops or maintaining continuous lines of defense. Thus the strongpoint system is "a saver of men."

The Engineer Component of the Infantry Division

[An article by Lieutenant Colonel Warren S. Everett, Corps of Engineers, in *The Military Engineer* August 1943.]

THE DIVISION engineer battalion differs from other combat units in the infantry division in that it is organized, equipped, and trained primarily to execute technical engineer work which will assist the division in accomplishing its mission on the battlefield. The primary arms of the engineer battalion are not rifles, machine guns, mortars, or howitzers, but engineer tools and transportation.

MISSION

The various applicable field manuals generally state the mission of engineers in the following terms:

"To increase the combat effectiveness of the other arms through the execution of work:

1. To facilitate the advance of our troops.
2. To impede the advance of the enemy.
3. To provide for the shelter and comfort of our troops."

Within the division, engineers are organized and equipped primarily for carrying out the first two missions. Providing for the "shelter and comfort of our troops" is a function which is, for the most part, beyond the capabilities of division engineers and must be accomplished by engineer units of higher echelons. In garrison, for example, this function is handled by the Post Engineer who operates as an agency of the Army Service Forces. About the only way in which the division engineer battalion is able to provide regularly for the comfort of our troops is in the matter of water supply. For this function the engineer battalion is equipped with four very excellent water purification units and necessary auxiliary equipment such as pumps and storage tanks.

DUTIES

The major engineer duties which fall under the headings of assisting our own advance or impeding the advance of the enemy, and which are those for which division engineers are primarily organized, include:

1. Emergency repair of roads and bridges.
2. Construction of rafts, ferries, and bridges capable of passing the forward echelon of the division over small streams. (Little of this equipment is organic in the division engineer battalion; nearly all of it must be provided by attaching engineer ponton units to the division.)
3. Removal and passage of obstacles and mine

fields and reduction of deliberate defenses impeding movement.

4. Construction and defense of obstacles, including mine fields and demolitions.

5. Construction and repair of advance landing fields.

Division engineer duties of secondary importance include:

1. Emergency employment as division reserve.
2. Layout of hasty defensive positions.

Division engineer duties involving specialists or members of the staff of the engineer battalion are:

1. Engineer reconnaissance.
2. Engineer supply.
3. Water supply.
4. Map supply.
5. Technical advice to division commander and general staff.
6. Supervision of camouflage training and camouflage discipline within the division.
7. Assistance in the engineer training of infantry Ammunition, Pioneer, and Antitank Mine Platoons and the Cavalry Reconnaissance Troop.

UNIT ENGINEER

The dual role of staff officer and troop commander is a responsibility of the engineer officer commanding engineer troops assigned to any unit of combined arms. This engineer officer, whether he be the division, corps, or army engineer, or even if he is the commander of an engineer platoon or company attached to a regimental combat team, is known as the "unit engineer."

It is important to note, in speaking of unit engineers, that the unit engineer of a higher unit does not command the unit engineers of subordinate units. For example, the corps engineer does not command the division engineers of divisions assigned to the corps; nor does the division engineer command a platoon or company commander of his battalion when that platoon or company is attached to a regimental combat team. However, if the corps engineer considers it essential that a division engineer battalion execute work essential to the operations of the corps, he arranges with his corps commander to have this mission assigned to that division.

While the unit engineer in the division has dealings with all members of the general and special

staff, he looks to the division commander for his orders; and members of the general or special staff never issue orders to the division engineer, any more than they would to other unit commanders, unless they do so in the name of the division commander.

CAPABILITIES AND LIMITATIONS OF DIVISION ENGINEERS

The capabilities of division engineers as they are now organized fall far short of being sufficient to care for the engineer needs of an infantry division except under very favorable circumstances. In a War Department directive concerning triangular divisions the following statement is made:

"The triangular division is intended to have the organic means to function as an *interior* division of a larger unit . . . The engineer battalion is not intended to be responsible or equipped for heavy road construction, for map reproduction beyond simple sketches or diagrams or for floating bridge operations, but is responsible for engineer reconnaissance, for aids to forward movement of the division, and for measures to hinder enemy movements."

As a result of the very great limitations on the amount of work that can be executed by the present reduced strength of the engineer battalion, it is one of the most important responsibilities of the division engineer to see to it that his battalion is not frittered away on non-essential work or on work which is sufficiently non-technical in nature that it can be adequately handled by the units needing this work.

For the same reason it is the division engineer's duty to pass on to engineer agencies outside of the division all requests for essential work which does not fit directly into the training program of the engineer battalion. In garrison the job of consolidating and processing these requests is performed by the assistant division engineer, whose value to the battalion can be measured directly in terms of the amount of work which he can divert away from the battalion and pass on to the Post Engineer or other suitable agencies outside the division.

Until training is completed, it is the mission of the assistant division engineer section to find means to take care of all division requests for engineer assistance without interfering with the training of the engineer battalion. If this function of the division engineer section is thoroughly understood by the division staff, it will save the engineer battalion many interferences during the time when its first interest is in training; and it will at the same time speed up the accomplishment of the *essential* needs for engineer work within the division. Requests for non-essential engineer work, or work which does not contribute directly to preparing the division for its

combat mission in accordance with policies of the division commander, are filtered out by the assistant division engineer section as they are processed.

In the field the assistant division engineer section exists primarily to provide engineer representation at the division command post in the absence of the division engineer; hence, the assistant division engineer will be especially trained to make recommendations for location of water supply points and main supply routes, to give technical advice on the employment of engineer troops, to furnish up-to-date information on road and bridge conditions within the division area, to make recommendations for traffic circulation and control, and to act in general as a liaison officer between the engineer battalion and division headquarters.

CONCLUSION

In conclusion, the following points with reference to the engineer component of an infantry division deserve particular emphasis:

1. Engineers can serve the division effectively only as long as they are permitted to keep their tools and transportation intact.

2. Division engineers are not organized or equipped to handle with their organic means the routine housekeeping requirements of the division for construction and utilities work. If the engineer battalion is to be permitted to carry on its training without interference, this work must be handled insofar as possible by the units directly concerned; and the balance must be taken care of through the assistant division engineer section by using facilities available to the Post Engineer.

3. In the field the engineer battalion can accomplish only the most essential engineer work; and this work will habitually be crude in character and sufficient only to meet immediate needs.

4. Since engineer work usually requires as much time as can possibly be made available, it is absolutely essential that the division engineer continuously be kept informed of all plans of the division commander and the general staff. If this is done, much of the advance engineer planning, and often a great deal of actual engineer work, can be completed by the time formal orders are issued to the division engineer.

5. Within the limitations stated, the engineer battalion exists solely to render technical engineer service to the division. It is the division engineer's job to see to it that this service is rendered promptly and efficiently. The ultimate goal of the division engineer is so to anticipate division requirements for engineer work that by the time the division commander calls for engineer assistance he can tell him his needs have already been provided.



MILITARY NOTES AROUND THE WORLD



GERMANY

A Two-Way Weapon:



This German tank destroyer, captured by American troops during a battle against the Tenth Panzer Division in central Tunisia, can work both ways. Equipped with a 75-mm gun and dual controls, it operates both forwards and backwards. After an American Ordnance Salvage crew had reconditioned it and painted a star on it, an American crew took charge and went into battle with it against its former owners—truly a two-way weapon.

(Illustrated London News)

Headquarters Trains in Russia:

German armies in Russia find it necessary to hold very wide sectors of the vast front, which makes it difficult for the various army commanders and staffs to cover their sectors adequately. Wherever railways make it practicable, "headquarters trains" are employed. Such trains offer several advantages: the commander and his entire staff are quartered on the train and are therefore always available to each other; where tracks permit, the commander can move along the sector and obtain first-hand knowledge of the terrain and the military situation; and all sorts of equipment can be carried on the train so that it is always at hand when called for. A complete communications system, including radio, telephone, teletype, etc., connects the train with the various corps, divisions, and regiments along the front. Maps, typewriters, and printing facilities are

carried, and plans of operations can be worked out and immediately transmitted to the various units. Of course, sleeping and eating facilities are provided for all on the train. Such a train is the center of constant activity. Couriers are always coming and going, visitors are received, conferences are held, and prisoners of war are interrogated. The headquarters train is thus the brain center of the army.

(Deutsche Illustrierte, 6 July 1943)

Training in the Operation of Assault Boats:

The National Socialist Motor Corps has assumed the task of providing pre-military training in the operation of large and small pneumatic rafts and assault boats, organizing special motor boat units at posts of engineer reserve battalions. The units are recruited from the Hitler Youth Motor Organization, and after receiving the preliminary training the young men either volunteer for enlistment in the Engineer Arm or are mustered into that arm on the basis of their training records.

(Vierteljahreshefte für Pioniere, No. 1, 1943)

Electric Power Problems:

In 1941 a German expert stated that Germany's capacity for the production of light alloys was practically unlimited if she could obtain sufficient quantities of electric power. Recent indications from the Reich reveal that the power situation is not at all satisfactory. The withdrawal of one half of all coins in Germany containing aluminum shows that the production of that metal, which requires a great deal of electric power, is not up to requirements. There have been reports that hydro-electric power stations in south and southeastern Europe have been suffering from a water shortage. Belgian sources have attributed the drop in power production to poor coal, and several German producers of electricity have complained that they could not get enough coal to work at capacity. The great air raids that destroyed the Eder, Möhne, and Sorpe dams in May must have reduced Germany's power output seriously, and a subsequent order curbing the use of electricity in the country is regarded as a result of those raids.

*(The Aeroplane [Great Britain]
and news reports)*

The German 50-mm Light Mortar:

The German 50-mm light mortar is a compact weapon weighing 31 pounds. It is muzzle loading, and a trigger mechanism fires a high-explosive projectile (with fin assembly, booster, and point detonating fuse) from a smooth-bore tube. The elevating mechanism is graduated between 45.5 and 90 degrees, and the traversing mechanism covers an arc of 30 degrees. It is an easy weapon to carry and to fire having a rate of approximately 45 rounds per minute, or six rounds in eight seconds. Its minimum range is 50 yards, which increases to 550 when the tube is lowered to 45 degrees.

(*Army Times*, Washington, D. C.)

The "Tiger" Tank:

The 60-ton German "Tiger" tank, which has attracted world-wide attention this year, is powered by a liquid-cooled V-type motor of 650 to 700 horsepower, giving the vehicle a speed of as much as 28 miles per hour and the ability to climb slopes up to 40 degrees. From the motor in the rear, the power is transmitted by a universally jointed shaft to an eight-speed transmission located in the front of the tank between the driver and the radio operator, and from this to the shafts of the spurred wheels which drive the chains. In place of the usual "stick" steering arrangement and the normal gear-shift, the "Tiger" has a steering system operated by a wheel like that of the ordinary motor vehicle. The tank turns by the separate braking and accelerating of the treads, the power being applied by an oil hydraulic system. Thus the hand wheel serves only for control or release of this power. Similarly in the case of the transmission, there is provided only a small pre-selector, after a system already familiar in automobiles, while the actual process of shifting gears follows this automatically without requiring any effort on the part of the driver. [For a Soviet evaluation of this tank, see the MILITARY REVIEW for August 1943, page 73.]

(*Motor Schau*, Berlin, Germany)

GREAT BRITAIN

The Spigot:

Members of a British Home Guard unit are here shown with the latest type of gun to be issued to

them, the Spigot. This gun projects a large bomb whose tail fits over instead of inside the barrel. It can easily fire at the rate of fifteen rounds a minute and, although unwieldy in appearance, it is remarkably mobile.

(*Illustrated London News*, 5 June 1943)

Naval Achievements During the Tunisian Campaign:

In a message dated 13 June congratulating Admiral of the Fleet Sir Andrew Cunningham on the achievements of the Navy during the Tunisian campaign, Prime Minister Churchill included the following figures:

"The daring and devotion of our submarines succeeded in sinking 47 ships, and the surface forces 42 ships of an aggregate tonnage of 268,600. When to this is added the sinkings by air, a grand total of 137 ships and 433,400 tons is reached. This was 32 percent of the estimated shipping initially available to the Axis at the beginning of the Tunisian campaign.

"During the long struggle on the mainland the Navy and the Air Force, working in the closest co-operation, sank 21 enemy destroyers or torpedo boats and many small craft, and prevented 35 percent of the enemy supply ships and transports from reaching Tunisia.

"To the minesweepers fell the honor of reopening the Mediterranean by clearing the channels, 600 miles long, between the 9th and 21st of May.

"The protection of our own convoys was carried to the very highest point. Over the whole vast mass of shipping which entered the Mediterranean between the 8th of November 1942 and the 8th of May 1943, the losses were less than 2¼ percent."

(*The Army Quarterly*, Great Britain, August 1943)

Production of Armaments:

Britain's armaments output has increased by 300% since 1940, but imports of raw materials have dropped by 50%. This has been achieved by substitution of materials, by new production methods, by economy in design, and by reclamation. It is estimated that new methods of forging shells have saved 400,000 tons of steel and 18,000,000 man-hours. By substituting a mixture of cement and sawdust in place of wood for construction of army huts, 500,000 tons of timber have been saved.

(*PM*, New York)

ITALY

The 45-mm Mortar:

The Italian 45-mm Brixia is unique among mortars. It is loaded from the breech. A cartridge rather than a striker guide is the propellant used to fire the projectile. It is the only weapon of its type with a safety mechanism. A clip of cartridges (10 rounds) is inserted into a magazine at the breech, a lever located on the right side of the tube is pushed for-

ward opening the breech, the mortar shell is placed in the tube, and the actuating lever is drawn back closing the breech, forcing a cartridge into the chamber, and firing the weapon. Range adjustment is accomplished in this manner: Two small ports in the tube when aligned with two ports in a jacket over the tube release a sufficient amount of gas to lower the pressure and decrease the range. To close these apertures, the firer moves them out of line by the adjustment of a valve-control lever which moves the tube back until no gas can escape. The Brixia is a smooth-bore weapon throwing a one-pound projectile 350 yards with the gas ports aligned and 580 yards when the ports are closed. The mortar weighs 34 pounds and has a rate of fire of 25 to 30 rounds per minute. Its mechanism is so complex that it would be highly susceptible to the various causes of malfunction encountered in the field.

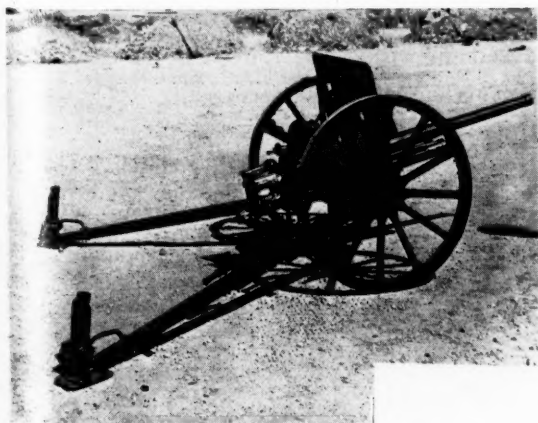
(*Army Times*, Washington, D.C.)

JAPAN

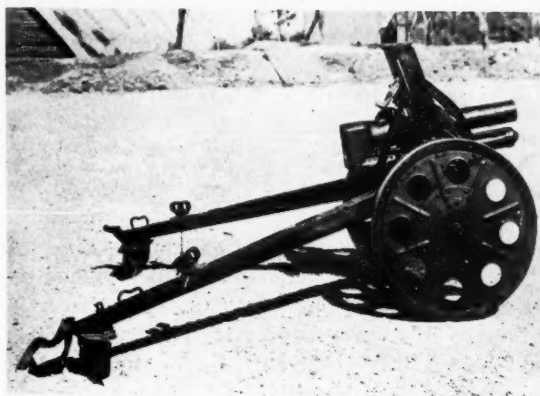
Japanese Matériel:



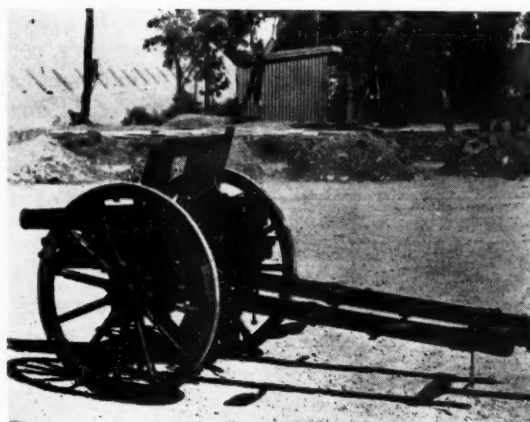
7.7-mm Model 99 (1939) light machine gun.
Magazine and flash hider in place, bipod
and monopod down.



37-mm antitank gun, side view.



70-mm battalion howitzer.



75-mm regimental howitzer.

3.7-cm Antitank Cannon:

The 3.7-cm antitank cannon employed in the Japanese Army fires a 0.7 kilogram projectile to a distance of 4,000 meters. It has a 40 degree traverse.

(*Die Panzertruppe*)

The 50-mm Grenade Thrower (Knee Mortar):

There are two models of the famous Japanese "knee mortar." Type 10, of 1921 vintage, is a muzzle-loading, smooth-bore weapon which can throw a standard Japanese hand grenade, plus primer and propelling charge, about 300 yards. It has no traversing, elevating, or levelling mechanism and may be fired from any angle merely by hand adjustment and the use of a range scale. The range scale is operated by twisting a knob located at the top of the leg. This regulates the size of a gas escape port near the bottom of the tube. A large opening in the port allows a good deal of the gas to escape, reducing the pressure in the tube and consequently shortening the range. The total weight of the weapon is 5.45 pounds. When assembled with the leg and spade fitted inside the tube it is a compact tube which may be carried in the soldier's belt or pack. The curved spade gave rise to the impression that the mortar was made to be

fired from the knee, a theory which was soon dispelled when it was used in this way, breaking the firer's leg.

(*Army Times*, Washington, D.C.)

UNITED STATES

Airborne Hangars:

As a result of cooperative efforts of the Engineers and the Air Forces, a demountable hangar has been developed which not only can be transported by air but erected in a matter of hours. The building has a steel frame held together with hinges and drift bolts, the pieces of which nest inside each other when knocked down for shipment. The walls and ends are formed by completely fabricated sections of fire-resistant canvas laced to the frame through a system of ropes hung from pulleys. Experience indicates that the building can be set up complete in a period of twelve to eighteen hours. The first building of this kind was 130 by 160 feet with a central clearance of 39 feet. The size can be expanded by adding more sections. The hangar can also be used as an auditorium for training troops or for repair units of various kinds.

Body Armor:

Body armor to sheath the wearer from neck to hips has been developed by the United States 8th

Air Force in England to protect members of bomber crews from missiles of relatively low velocity which have been found to cause the vast majority of wounds. The armor weighs twenty pounds. Its base is a sleeveless canvas slip-on with transverse pockets into which plates of steel are slipped. It consists of front and rear covers suspended from the shoulders and laced together along the sides.

Air Ambulances:

The success of the system of transport by air of wounded and ill military personnel has been amply proved. In the North African Theater some 18,000 sick and wounded men, Americans, British, French, and prisoners of war, were evacuated in this manner. A complete 250-bed hospital was flown from one North African post to another when shifting of hospital facilities became necessary. In New Guinea, 7,000 disabled men were evacuated in one month from Buna across the Owen Stanley Mountains to Port Moresby. Another 7,000 men were flown in, as well as a field hospital with 250 beds. A complete 25-bed hospital, including surgical equipment, supplies, beds, and medicines, was flown from St. Louis to a base in Alaska when fire destroyed a base hospital. In less than six days the new hospital was completely installed and in operation.

(*The Army Officer*)

Always mystify, mislead and surprise the enemy if possible, and when you strike and overcome him, never give up the pursuit as long as your men have strength to follow; for an army routed, if hotly pursued, becomes panic-stricken, and can then be destroyed by half their number. The other rule is, never fight against heavy odds, if by any possible maneuvering you can hurl your own force on only a part, and that the weakest part, of your enemy and crush it... To move swiftly, strike vigorously, and secure all the fruits of victory, is the secret of successful war.

—Stonewall Jackson, quoted by Lieutenant Colonel R. A. E.

Voysey in *An Outline of the Principles of War*.

FOREIGN MILITARY DIGESTS

The Commander and His Chief of Staff

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Colonel of the Guard M. Sokolov, Soviet Army, in *Krasnaya Zvezda* 5 June 1943.]

THE ROLE of the staff in combat is well known. Relying on his staff, the commander gathers information about the enemy and the operations of his neighbors and works out a plan of battle. If all departments of the staff work accurately, the commander constantly feels the pulse of the battle and has power to influence its course; and his orders reach his subordinates speedily. In the present war our staff officer personnel has grown and matured. In the most difficult circumstances of combat they do not lose their heads, they combine boldness of action with sober calculation, and they resolutely take risks when combat demands it. The staff officer has become the true helper of the commander, the reliable guide of his thought.

It is regrettable, however, that in our forces instances still arise in which staffs do not enjoy due respect but are essentially desk soldiers. In such cases, qualified staff personnel is eternally occupied with handling papers and deprived of the possibility of associating with troops and showing initiative. As an illustration let us cite a few examples from the staff experience of a certain division.

Once, while parts of this division were on the march, the chief of staff dispatched supplementary personnel for regulation of troop movement and at the same time withdrew those men no longer needed. It would seem that such prudent initiative deserved praise; but the force commander considered the measure an instance of self-will and, in the presence of subordinates, rebuked his chief of staff. That this example was not unique is proved by one other instance. The chief of staff held up the movement of supplies because the indicated route proved unfavorable. Another road had to be found. The division commander, when told of this, repeated the same rebuke, ending with this remark: "You forget that as yet you are only the chief of staff and not the commander. Don't act on your own. Just do what I hand over to you."

It is hardly necessary to point out that such a relationship with the chief of staff inhibits the growth of his creative abilities and blights the service as a whole. Along with this the commander himself, forced to waste much time in listening to unimportant reports, cannot concentrate all his attention on the main thing: i.e., direction of combat.

Conduct of senior commanders, naturally, is reflected in the lower ranks. Thus, for example, a certain unit commander of this division often gives orders to his subordinates, disregarding his staff. Consequently, one of the most important provisions of Staff Field Service Regulations is violated: namely, "The chief of staff must be aware of all intentions and plans of the commander." It is clear that the chief of staff, not knowing the commander's orders, can not check promptly as to their execution; and as a result combat is poorly directed.

There are also commanders who do not wish to listen to advice and suggestions from their chiefs of staff. This, in our opinion, is nothing but conceit. What such practice leads to is evident from the following episode: A certain unit commander, not heeding his chief of staff, gave an order based on very confused data regarding the situation. During the battle it was necessary to withdraw a battalion into reserve. This, along with other factors, caused serious trouble in the further course of the battle. Neighboring units, not aware of the battalion's withdrawal to reserve, assumed that this meant the start of a retreat; and they correspondingly changed their positions. A veritable state of confusion resulted.

Unquestionably the commander is absolute leader of his unit, bearing full responsibility for combat activity of troops under his command. But this does not by any means signify that he may disregard the knowledge and experience of his officers. On the contrary it is necessary to mobilize their energy completely in the interests of the service. Not without reason the great Suvorov once remarked: "I am always happy to accept the good advice of any officer, even a subaltern."

Finally one more feature of the relations of some commanders with their staffs must be mentioned: As the staff is assigned a minor role, the commander usually takes sole credit for the successful course of the fighting while, on the other hand, every mistake in the operations of troops is explained by the

bad staff work. As a result of such a short-sighted approach, many capable staff officers are not satisfied with their service and try in every way to be transferred to "line" duty. Such a point of view, of course, is mistaken if only because of the very fact that nobody ever considers staff officers as non-combatants. Dissatisfaction arises from another cause: Immersed in paper work, staff officers do not experience full-blooded combat life. But on this, as on other questions, our instructions contain precise directions to the effect that along with collection of information of various kinds, the staff is to learn about troops by personal contact.

It is not difficult to draw the inference. Where the staff is assigned a secondary role and initiative of its members is crushed, it is not possible to expect harmonious operation of all types of troops in battle.

Trends in Tank Warfare

[From *The Tank* (Great Britain) July 1943.]

THE DEVELOPMENT of armored warfare during the present war has followed a steady and consistent course, which may serve for a fairly reliable forecast of its future form in the great mechanized battles yet to come.

When the German attacks in the West in the early summer of 1940 over-ran Holland, Belgium, and France at lightning speed, and placed the *Wehrmacht* in control of the whole vast area from the Arctic Circle to the Pyrenees, the world saw as one of the main causes of its far reaching victories the overwhelming superiority of the panzers over the Allied tanks. From the published proceedings of the Riom Trials we are now able to confirm the correctness of this view, and further see in what exactly this ascendancy consisted.

Firstly, the Germans enjoyed a considerable numerical superiority—precise figures cannot yet be ascertained, but the 10 German Panzer Divisions which took the field in the West in 1940 had an establishment of close on 5,500 tanks. To oppose these the Allies had less than 4,000, of which three quarters were French.

The German tanks were also on the whole better machines. Their light and medium types were more thinly armored than their Allied counterparts, but they were faster and had a greater radius of action, and their guns too had a range of 800 to 1,200 yards, whereas the bulk of the French tank guns had an effective range of only some 400 yards. The French machines too, were for the most part underpowered for the work that they had to do. Finally, few of them were equipped with wireless, which all the German tanks had, and without a full system of wireless intercommunication any real system of tank tactics is impossible.

In their heavy "B" type, a 32-tonner carrying a 75-mm and 47-mm gun, the French Tank Corps had a machine better in every way than anything that the Germans could oppose to it. Its only comparable rival, the Pz. Kw. 4, though faster, was more lightly armed, with only its one 75-mm gun, and more thinly armored. But there were only about 300 of these "B" type tanks in the French Army, and the bulk of its tanks were the inferior H (Hotchkiss) R (Renault) models with a few of the fast but lightly armed Somua type.

French tank material then was inferior to that of the Germans, nor, it is generally considered, was the best use made of this inferior material. French traditional doctrine regarded the tank as an adjunct to the infantry, an arm of accompaniment to be used in close cooperation with the other arms, and as strictly limited in its scope of employment as in its radius of action. The bulk of the French tanks, as far as they found opportunity for employment at all, were used in this way.

After the outbreak of war four independent armored divisions were formed, comprising in all some 250 heavy and 300 medium tanks. These formations were too small for their work and moreover were only partially trained. In the stress of battle, though they did well what they were given to do, they had to be used piecemeal and in defensive or counterattack roles, and could not avail to stem the tide of defeat. Their losses in action were heavy, as were those of the smaller tank units acting in close cooperation with the infantry formations. These were frittered away in unsuccessful local actions, and many of those which survived battle fell into hostile hands when the breakdown of the French administration services deprived them of the petrol without which they could neither fight nor escape.

The Germans on the whole were well satisfied with the performances of their tank units in France in 1940. Some notifications were made, the armored Panzer Divisions were made smaller and more flexible and mobile, and the proportion of the heavier models in them was increased. But, broadly speaking, the *Wehrmacht* entered upon the war with Russia in 1941 with proportionately the same tank material as it had had in France the year previously. No doubt the German High Command thought this material quite good and ample enough for the job it would have to do; and so it should have been, for the Russian Tank Corps was at this time not much better equipped to meet it than the French were when they suffered so swift and complete a defeat.

The Red Army had certainly far more tanks than the French, and most of these were considerably faster and had a wider radius of action; but they were more thickly armored, their gun power was no better, and they too lacked wireless equipment. Except for those units which had taken a part, not very successfully, in the short Finnish campaigns,

the Russian Tank Corps lacked battle experience as compared with the German Panzer Divisions. Under these conditions, it was bound to prove itself inferior, and after the first few weeks of the 1941 campaign, when it suffered several disastrous defeats, it had to give up any attempt to encounter the German tanks in fair fight. The German Pz. Kw. 4s, in fact, forming the hard core of the Panzer Divisions, were indisputably the queens of the Eastern battlefields. Yet the great area of the theater of war, the larger numerical forces in action, and the stubbornness and cohesion of the Red Army prevented the invaders pressing home their brilliant initial successes fast and far enough to secure any final or even decisive victory. In these defensive battles the Russian tanks, used in small bodies and acting locally by surprise counterattack, and at need as mobile or even immobile strong points, did highly useful work, in which they acted throughout in close cooperation with the infantry—exactly in the way that the French tanks might have done, despite their technical inferiority, had there been more of them, and had they been given time to devise and practice these tactics.

As is well known, the Germans, as the campaign wore on, were gradually compelled to give up using their armored forces for the deep, far-ranging penetration movements which had served them so well in France, and tended more and more to confine them to action in close conjunction with their slower-moving arms for operations of short range and lesser depth. But though in these they met with considerable success, they failed anywhere to rupture the full depth of the Russian Front, and the Red Army, like a moving fortress on wheels, moved slowly and ever more slowly back, fighting all the way, until finally the German onslaught upon it had shattered and died away.

During the winter of 1941-2, the Russians carried out at great speed a complete reorganization and rearmament of their Tank Corps in readiness for the next summer campaign. Three models, the medium T 34 and the heavy and super-heavy Klim Voroshilov (K. V. 1 and 2) were brought into service. Their armor was three to five times as thick as that of their predecessors and equal or greater speeds were secured by cutting down on radius of action; they were armed with 75 or 152-mm guns, which were better than anything the German machines could oppose to them; and all had a full wireless equipment. But though great numbers of these new and excellent machines were brought into service before the 1942 campaign, and where they were available put the Russian Tank Corps on an equal footing with the German Panzer Divisions, the latter still enjoyed a heavy numerical advantage. So the Russian Tanks had to be used sparingly and cautiously, whereas the German High Command could afford to be lavish and even prodigal with its armor.

In the matter of tank tactics the tendencies noted

in the course of the campaign of 1941 were accentuated in that of 1942. Independent action was more and more at a discount and cooperation between tanks and the other arms became closer and more intimate. German armored formations which got too far ahead of their slow-moving comrades in the advance into the Caucasus and across the Don towards the Volga were as roughly handled by the Russians as were the Russian tank armies which, early in 1943, thrust forward over the Donetz towards the Dneiper in pursuit of the Germans retreating from Stalingrad and Rostov. Once more it was shown that the best value is normally got out of tanks when they are used in close cooperation with the other arms. To fulfil this role, the tank of today has developed into a heavy, powerfully-gunned, thickly-armored vehicle, with radius of action and high maneuverability less important than they were once thought to be. Mobility has largely, but not altogether, been sacrificed for hitting power and protection. High tactical speed for short distances or periods is still necessary, but strategical mobility has all but disappeared for any but the lightest types, which are, strictly speaking, not fighting vehicles at all.

It is possible that these may not be permanent tendencies, but now that the tank and antitank weapons of all the belligerents are so highly developed and powerful, and some sort of equilibrium between armored attacks into armor defense has so generally been reached, it seems impossible that we shall again see those far-reaching and spectacular tank incursions which played so startling and decisive a part in the west in 1940. The role of the tank in battle, as distinct from its role in explorations or pursuit, will more and more, it seems, come to resemble that of mobile artillery rather than that of cavalry, and tank operations will normally be episodes only, though possibly decisive episodes, in the great struggles in which the efforts of all arms and weapons are combined to secure victory.

Attack on Inhabited Places

[An extract from an article translated at the Command and General Staff School, Fort Leavenworth, Kansas, from the *Revista Militar* (Argentina) July 1943. The article appeared in that magazine as a translation (probably from German) of an article by Majors Greiner and Nebe.]

DECISION to attack an inhabited place should be made only when its capture is of decisive importance. If one is forced to attack the inhabited place, then the effort should be made to take the place by action of the main forces which will close in from right and left while a frontal attack is made with weaker forces only. Very large inhabited places do

not always permit employment of this fundamental procedure. In such cases, there will frequently remain no other solution than that to have recourse to frontal attack after a period of initial (artillery) preparation. The method of attack depends on the characteristics of the inhabited place.

Capture of a Small Settlement

Tactical points: Dispose the main forces in such a way that they will advance on both sides of the place (Figure 1). To make this possible, attack from the front with weaker forces and neutralize the lateral

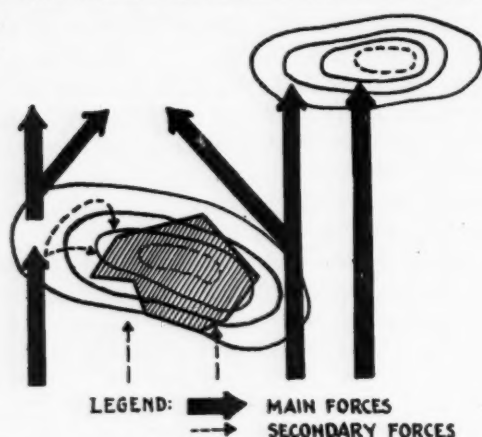


FIGURE 1.

edges with gun fire. The forces intended for the advance to right and left must not draw near to the edges of the place as they would thus be diverted from their fundamental objective.

Diversion of weaker forces toward the edges of the village or into the rear of forces occupying it must be effected after the advance of the main forces to the right and left has continued beyond the village. From the very outset, reinforcements which are to follow the most advanced forces must be prepared.

Capture of a Broad, Deep Inhabited Place Having Organized Defenses

Tactical points: Inhabited places with an extended front make frontal attack unavoidable. If the area lacks depth, as in the case of towns strung along a road, a stream, or a narrow valley, conduct of the attack is relatively simple. Proper penetration by separate attack groups can occasion, in most instances, the fall of the whole place, part by part. Confronted, as shown in the schematic diagram (Figure 2), with an inhabited place of considerable depth in which the enemy is organized for defense, the attack must be carried out in accordance with a methodical plan, which is the only means of avoiding defeat, bloody losses, and a set-back of morale.

The attack plan used in the base of broad and deep inhabited places requires, as a first step, through reconnaissance by all arms and branches of the forces engaged, the same as in the attack of a strongly organized position.

Regarding defensive installations behind the front of the inhabited place, some information may be gained by means of planes (air photographs). The results of reconnaissance must be considered in establishing a joint plan of fire, for assuring cooperation of all arms, and particularly for assigning adequate missions to available high-angle weapons.

Thorough artillery preparations should precede the attack. This fire should destroy defensive installations and reduce the defender's will to resist. In executing the last phase of the attack, it is necessary to take into account the fact that the enemy's strong

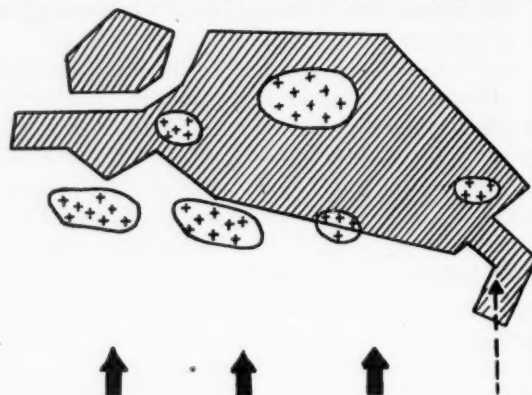


FIGURE 2.

points and works may offer him considerable protection against the fire of high-angle weapons.

This methodical manner of initial preparation almost always requires many hours of time.

In executing the attack it must also be taken into account that direct support by the artillery must cease when the most advanced portions of the infantry are at a distance of about 300 meters from the enemy and, in a lateral direction, about 200 meters from the enemy in order to avoid injury to friendly forces engaged in the attack. Consequently, an abundance of mortars and infantry weapons must be provided in advance for direct support of the infantry and for neutralizing the enemy on the edge of the village, particularly after the artillery is obliged to shift its fire to the interior of the village. For assuring close cooperation between heavy weapons and the most advanced elements of the engaged forces, it will frequently be necessary to place these weapons under the orders of the infantry companies. It is necessary to neutralize, for as long a time as possible, enemy forces located on the edge of the village, for the smoke produced by explosions and the dust produced by shells striking against the walls of buildings affords, for a certain time at least, good protection for the infantry, facilitating its advance. At the moment when the fire of friendly artillery is transferred to the rear zones, the infantry should attempt to effect a breakthrough as quickly as possible. A breakthrough by the infantry means, in most cases, hard hand-to-hand fighting in streets, alleys, squares, houses, and gardens. Advancing through all favor-

able places, including houses and gardens, the infantry attempts to force its way ahead with the idea of pushing on to the opposite edge of the town. For the time being, it is necessary that infantry guns be used in direct fire as close as possible to the most advanced positions with a view to facilitating the infantry assault, for this assault should not be stopped by any skilfully placed machine gun or stubbornly defended street barricade.

Capture of an Inhabited Place of Considerable Depth

The method of attack agrees in fundamental principles with that described above. It differs essentially only in the fact that in the majority of cases the attack must be conducted in stages (Figure 3). The fire for softening groups of houses and strong points is even more important than in the preceding case. At times the infantry will have to retreat a certain

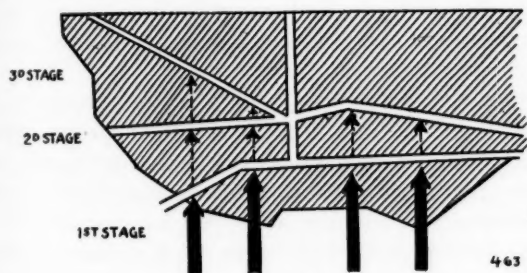


FIGURE 3.

distance in order to permit another bombardment of certain places by artillery and high-angle weapons. Engineers find ample opportunity here to show their ability. Demolition charges and flame throwers for smoking out nests of resistance will be needed frequently. The fact has to be considered that at times, the civilian population may participate in the battle in addition to regular enemy forces.

If the place has been captured and it is not necessary to continue the advance, then in the majority of cases it is better to establish oneself for defense in the open terrain outside the captured place and near the edge of the town. In this way it will be possible to frustrate a simultaneous attack by the enemy on the outside and of those enemy elements which are hiding in the town in rear of the attacking infantry. For reasons of morale, the evacuation of troops from the town, which will usually be on fire and will present terrifying and unaccustomed scenes of all sorts, is prescribed. Mopping up scattered enemy forces still hiding in the place, or which have been rounded up, is always a responsibility of forces in the rear.

It is always necessary to maintain reserves who are quickly available in the rear of the attacking forces. To avoid reverses, it is well to keep these reserves very close to the front line in order that they may intervene at an opportune time.

War in Forest and Marsh

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by Heribert Huber, war reporter, in *Völkischer Beobachter*, Berlin, Germany, 31 May and 1 June 1943.]

WHEN spring arrives in Germany the northern sector of the eastern front from Leningrad to Lake Ilmen enters a period in which the weather makes its heaviest demands on the army command as well as on the individual soldier, a period which generally lasts only a few months but in some places may continue until the beginning of the next winter. It is a period of water and mud, thawing swamps, steaming marshes, and corduroy roads. It alters the entire face of operations. War on frozen soil, war of mass attacks and motorized weapons turns to a war of forest rangers, of strongpoints, of artillery, a war waged by the supply service, a war over a few connecting highways and roads; it becomes a war against moisture which is an even more persistent enemy than the Soviets.

The main line of battle runs to a large extent through woods and swamps, generally far from human habitations.

Battalion and regimental headquarters and even divisional staffs are located in forest camps which consist of wooden bunkers built deep into the ground. When the snow thaws, all natural and artificial depressions are filled with water; for the hard-frozen ground lets nothing through, and positions, trenches, command posts, and bunkers are flooded. The shelters have "water holes" dug in the ground beneath their floors, and the men protect themselves by emptying the water every morning, by laying walks in the trenches, and by changing their felt boots for rubber ones.

When, however, the general thaw comes and rain storms lash the forests, the frozen soil becomes soft and the ground water rises daily. It is no longer any use to bail out the water unless the positions are elevated, which is rare. Then there is nothing to do but leave the old shelters as they become "drowned out." The race for high spots begins, especially those spots which have sandy subsoil and which, though they may rise only a meter above the general level, still are drier and permit digging. Quite frequently the fight for a dominating line of hills is not only for the general strategic advantage which it offers but also to determine whether one's own line will lie in marshy land or on dry terrain. Yet such elevations are rare, and tactical considerations do not always permit taking advantage of them. In such cases the protecting earth has to be abandoned, and "summer camps" come into existence. It is necessary that these summer camps not only be protected against enemy fire from above but also from attack by the water from below. In

place of winter positions with trenches, dugouts, and parapets, green walls of fir trees and brushwood appear as a protection against enemy eyes; and wooden combat positions resembling medieval bastions are set up at intervals behind the line.

It is not only moisture that forces the men to build new positions; the locations of combat positions are discovered by the enemy and have to be moved away from his steady fire. All this has been done so many times in the northern sector that all the positions and bunkers taken together would make a city of enormous size. But the most unpleasant thing is to be forced to engage in this sort of construction during the muddy season when, under enemy fire, one is forced to lie on the wet ground day and night with no protecting wall to shield him from the cold or the hostile fire and while the hole which normally would afford protection against shell fragments is filled to the brim with muddy water.

Swamps and marshes of the northern sector, bottomless and treacherous as its forests, have warm, subterranean springs. As long as the severe cold holds them in subjection with a thick coat of ice, large bodies of troops with tanks and guns are able to operate on them. But only a few days of thawing weather bring the marsh to life and end the Soviet winter operations the execution of which depended on frozen swamps and rivers.

Many front-line positions have to be abandoned by both friend and foe. "Winter roads" cannot be used; and war over broad fronts becomes limited to narrow positions, passes, and strongpoints. The main battle line changes its course and zig-zags in order to make wide detours around the marshes. Until the following winter all movement ceases on the treacherous surface from which, as the season progresses, myriads of gnats arise.

Where there are forests the marshes come to an end, for no forest can grow in a marsh. Nevertheless, during the wet season, forests are by no means dry. One is forced to wade through a sheet of water of varying depth and seek out every high clump of grass that offers any sort of dry underfooting. When a shell comes roaring overhead there is nothing to do but throw oneself into the water as quickly as possible.

When, at the front, the far flung operations of war become bogged down and it is no longer anything but a fight for scattered vital points, then farther to the rear there flares up the war of the supply routes on whose maintenance the life of the front depends.

The few highways which Soviet "planning" built here, without any drainage or ditches for carrying away the water, have immediately turned into a soupy, sticky, bottomless mass of mud which at first reaches as far as the ankles, then as far as the knees, and at times as far as the waist. If shells have struck recently on the high-

way, it may happen that the foot will suddenly hit a bottomless hole. On such roads many vehicles are forced to drop out. There they stand along the edge of the road, hopelessly stuck. Passenger vehicles can maintain the pace for a long time and the caterpillar motorcycle and the heavy tractor still have a chance of making it. Quality of the equipment and careful driving are vital in such cases.

The most dependable and faithful helpers, however, are the horses. Singly, or in two, four, or six-horse teams with heavy limber wagons, they patiently overcome the most difficult places. Thousands of engineers and tens of thousands of civilian workers are removing the worst hindrances. Ditches are dug in the mud, sand is scattered in them, and gravel and stone brought from long distances. In those places where all motor vehicles become stuck, tractors stand ready to tow them through one at a time. Such passages are not popular. They always cause congestion of traffic and would prove a good target for enemy aircraft if German pursuit planes did not watch over the area.

The few Russian roads are far from adequate for supplying the front. Supply service depends principally on corduroy roads which are not indicated on any map. They extend in a close network through the forests and marshes, partly in the form of "auto highways" with a width of as much as six meters, partly as single track roads with passing places, partly as narrow foot paths. With an average thickness of ten centimeters for tree trunks, ten thousand trees are needed for constructing but a single kilometer; and with a million trunks a hundred kilometers can be constructed. There is no scarcity of construction material, and the results are worth the effort.

Like dry islands, corduroy roads rise out of the mud and marsh. Naturally they require constant repair and improvement, especially since they are exposed to much wet weather. In the Volkhov area, the water at times overflows the corduroy roads to a depth of one and a half meters so that all land traffic is stopped and pneumatic and wooden rafts assume the task of moving supplies. A trip over these roads is not exactly one of the pleasant experiences of life. The roughness, which cannot be avoided in construction, regardless of effort, shakes the vehicle worse than the worst cobblestone pavement. Many points are under enemy artillery fire. Shells often strike squarely on the corduroy roads, and dead horses remind one how close death is. One always rides through such zones at a brisk trot, for there is no chance to detour. It is not always possible to travel over the supply routes as far forward as the battalions and companies. In such cases mules or men bring the ammunition up to the front, and men carrying the food have long distances to cover. Supplies can be brought up to the front lines only at night; and after the light-reflecting snow melts into

mud and water, darkness is added as a new enemy. It is only necessary for one to turn on his heel a few times to lose all sense of direction. At such times the flash of one's own artillery and the glow of flares serve as reference points for determining in what directions friend and foe lie. Forest paths provide excellent means of orientation. Much-used foot paths are lined on one side with the trunks of small birch trees whose light-colored bark forms an unmistakable marker by night. Messengers who travel day and night in all kinds of weather over the routes from companies to battalions and regiments know every foot of the way and penetrate the darkness of night with the eyes of a lynx. They can guide one safely past water-filled shell craters and mine fields to his objective.

When one considers these conditions, he forgets only too easily that the enemy has to fight against the same difficulties; and for him they are considerably greater, for he lacks the firm roadways and railways that are in our possession.

Snipers in Stalingrad

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by L. Vysokoostrovsky, in *Krasnaya Zvezda* 19 December 1942.]

THE SNIPER'S work in prolonged street battles is considerably different from his usual activities in the field or even in irregular terrain. City houses, ruins, and various public buildings permit troops of both sides to be disposed at exceptionally short distances from each other. Often only twenty or thirty meters—and sometimes even as little as five or six meters—separate our soldiers from the enemy. Each bit of undefended territory is thoroughly observed from behind safe concealment and fired upon with previously adjusted fire. All this makes it difficult to choose sniper positions.

At the same time, experience in street fighting has shown that when a rifle is equipped with a telescopic sight, the sniper does not always need to move to the most advanced line. He may occupy a higher position to the rear or on the flank some distance away from his unit. To be well camouflaged and to remain outside the combat formations of the infantry so as not to be subjected to double fire action is the basic principle, observance of which is indispensable.

Proximity to the enemy complicates masking of positions; but, on the other hand, the resourceful fighter can do a great deal to make himself unnoticeable to hostile eyes in the streets of the city. If, for example, it is necessary to fire from a window, it is best not to come up close to it but to fire from the depth of the room. This muffles the sound to a certain extent and limits the visibility of the flash. In a wall, dugout, blindage, etc., it is best to make a

funnel-shaped loophole with the large opening toward the interior. Such a loophole is less conspicuous, decreases the probability of direct hits in the aperture, and affords greater convenience in firing.

The experienced sniper may find a dependable fire position in a heap of bricks of a smashed building, in a disabled tank or automobile, in sheets of torn-up roofing, in a half-ruined factory chimney, in a gas tank. One of our snipers sat in a round metal oil container that had been perforated by fragments of bombs and shells; and, although the line changed hands several times, the sniper remained unnoticed by the enemy. He continued to fire at will and caused the Germans numerous losses.

The sniper's firing position, especially in a city, is a forbidden place for the whole detachment, squad, or company. Unless absolutely necessary, no one except the sniper and his helper has the right to go there or to open fire from that place. As a rule, the sniping pair must move out to the position at night or under conditions of limited visibility. In Stalingrad an experienced sniper was put out of action simply because one of his comrades crudely broke this fixed rule. He had several skilfully camouflaged firing positions and had fired from them for two months without mishap. One day, when the sniper and his helper had gone away to rest, an antitank rifleman with his large gun crawled up to their position under the cornice of a five-story building. For a while he fired to his heart's content; but the Germans noticed him, opened answering fire, and forced him to retire. The sniper who had been there originally did not know this, and when he returned to his position, a hail of lead fell on him right after his first shot. The sniper was wounded.

The camouflage of the sniper's position depends largely on his first shot. If he hits the target with his first bullet, he may be sure that the enemy did not notice him or, even if he did notice, that he won't tell anyone else. The successful first shot guarantees successful solution of other fire problems. Every miss is essentially a failure in the sniper's work. The target lives, and the enemy may get to know the sniper's position. In such a case it is necessary to try immediately to hit the target with a second and even a third shot.

To fire more than two or three times from one spot without success is not advisable. If the enemy is unhit, it is better to change the firing position. One of our snipers, Vernigora, once engaged in a duel with a German sniper. The opponents fired at each other through loopholes in two stone buildings. Vernigora used two bullets and did not hit. The German also missed but continued firing shot after shot. Vernigora crawled over to another loophole a few seconds before a hostile bullet hit the first one. He calmly aimed from the new spot and hit the Nazi. The timely shift in position helped the sniper to avoid certain death and to emerge victorious.

Practice shows, however, that even in such cases it is impossible to set up a pattern. It sometimes happens that it is better to fire more than three times from the same place. It is always necessary to estimate accurately one's possibilities, the behavior of the enemy, and the tactical situation. If, for example, a change of position requires movement across an open spot, then the danger of being hit is only increased. Therefore, it is better in such cases to keep on fighting resolutely and calmly to the end and then to act in accordance with the situation on the assumption that you have been detected.

Under field conditions snipers lying close to one another, generally work in pairs. They alternately play the role of killer and observer. In cities it is less possible to function in this manner. Here the sniper is frequently forced to work alone because of the difficulty of camouflaging his position in proximity to the enemy. The sniping team often choose positions at a considerable distance from each other but located so that it is possible to give mutual aid by fire at the crucial moment. Even when, under city conditions, it is essential to work in pairs, the men must not lie close together inasmuch as the enemy can discover them more rapidly.

When snipers work in pairs in the city, the observer usually watches the enemy through a chink in the wall, while the killer lies at a hidden loophole. When the observer gives a target indication, the killer opens the lid of the loophole, quickly finds the enemy, and fires. The work done, the loophole is again closed, the lid, made to resemble the outside of the building, masking the loophole.

Accuracy of the sniper's aim depends largely on skilful care of the rifle, especially the telescopic sight, and on the correct choice of ammunition. In city rubble, where it is necessary to crawl upstairs and over ruins, it is not easy to guard the weapon from chance jars. The inexperienced sniper, fearful of ruining the telescopic sight, sometimes prefers to take it off during movement and carry it in his pocket, shirt, or hand. It must be remembered that this is harmful to accuracy of fire. The telescope must not be taken off the rifle except in extreme emergency, since it is an integral part of the gun. The rifle from which the optical apparatus has been removed requires checking in combat firing.

So far as choice of ammunition is concerned, practice has proved that the sniper must have with him both armor-piercing and tracer bullets. This is necessary for shooting at automobiles and motorcycles. But for firing on living targets it is necessary to choose one kind of bullet and take care that all those selected are of the same date of manufacture and preferably even from the same case.

The Stalingrad snipers proved themselves well in battle and their ranks have grown considerably. In the division commanded by General Rodimtsev and in many other units, a series of snipers' conferences

for exchange of combat experience was organized. This appreciably increased the quality of their shooting and helped develop new groups of excellent riflemen ready to become snipers. The Hitlerites now rightly fear our sniper fire not less than the fire of a good Soviet machine gunner.

Armored Artillery In the Soviet Campaign

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from an article by Captain Duic, German Army, in *Artilleristische Rundschau* October 1942.]

The following description is based entirely on notes made by the author. Our battalion was 2nd Battalion of an armored artillery regiment of a Thuringian armored division.

The Capture of Ostrow on 4 July 1941.

THROUGH trackless forests, without contact with the enemy, and far in advance of the adjoining division, our armored division had reached Vilaka (see Figure 1) in the evening of 2 July. We had overtaken and completely defeated an enemy regiment which had been withdrawing eastward in a peace-time for-



FIGURE 1.

mation. As we continued on our way, enemy aircraft rising from a near-by field had passed over the security detachment of the artillery battalion at a low altitude without firing on them: they did not recognize them to be hostile troops. On 3 July the division reached the vicinity of the eastern Latvian frontier early in the forenoon. The Soviet maps which we now had to begin using did not give us

sufficient data on which to base a further advance on the city of Ostrow, situated on both sides of the Welikaja river. The information we already had at hand told us that enemy positions which were strong even in time of peace would be found along the Welikaja. And in Ostrow, a highway junction of the first importance, the bridge across the Welikaja must come into our possession as nearly intact as possible. All this required, to begin with, careful reconnaissance and exploration—then quick action.

With guards posted and hidden from the view of enemy planes, the division halted in the vicinity of the frontier. The motorcycle battalion of the division, reinforced by a battery belonging to the artillery battalion, had orders to proceed toward the northeast and seize possession of a bridge that was supposed to be just below the point where the Utroja empties into the Welikaja. Likewise, a reinforced rifle company was sent about seven and a half miles to the east toward the highway and railway connecting Dünaburg and Ostrow with orders to form a bridgehead on the far side of the Utroja. In addition to depending on the results of our reconnaissance of the enemy, our further advance depended on the condition of the bridges across the Welikaja and Utroja.

It was not until late in the afternoon that the radio message came in from the motorcycle battalion: "Instead of a bridge, there is only a two-ton ferry." Under these conditions a continuation of the march of the whole division was impossible in this direction. Only the reinforced motorcycle battalion continued on here, as an independent unit. Those of us in the battalion were certain that the battery serving with the motorcycle unit had a hard task ahead of them.

A short while before, the report had come from the motorcycle troops that the rifle company which had gone on to the east had reported that they had been attacked by strong forces of the enemy. Hence, a second battery from the artillery battalion had been sent off to support them. And now the rest of the advance guard was sent off as fast as possible to them, the remaining battery of the artillery battalion in the lead. A battery of guns attached to the battalion followed farther to the rear.

The rifle company which had been sent out in advance had seized the bridgehead in the morning without opposition from the enemy, and had quietly watched the busy traffic over the Dünaburg-Ostrow railway all day long. The highway which ran parallel to this railway line was concealed from view by the railway embankment. Not until afternoon had the company, using the attached antitank cannon, fired on a train which was running toward Ostrow loaded with tanks. Thereupon, the enemy began to unload and attacked with the tanks, but being suddenly attacked by our forces they were beaten off. A freight train which followed was set on fire. As the

situation was beginning to grow serious the first battery that had been sent out arrived and relieved them, scored a hit on the locomotive of a third train, and hindered the unloading. And now as darkness was settling and the remaining battery arrived the fighting died down.

Our first night on Russian soil! The bridgehead was helped by the presence of old World War trenches. German troops may have been stationed here in 1917.

Now that our presence was no longer a secret to the enemy it was up to us to impress him as much as possible with our strength. And so all night long, with the help of large quantities of ammunition, harassing fire was laid down on important points along the highway and on stations where it was suspected that unloading was in progress. The cannon battery sent bursts of shells into Ostrow some eight miles distant.

We expected the enemy to continue the attack the next morning, 4 July, but the attack did not materialize. The reconnaissance of the rifle troops revealed at an early hour that the enemy's tanks had retired to Ostrow, possibly a first success of our night's activity.

And so, early in the forenoon of 4 July, the advance guard reached the Dünaburg-Ostrow highway and set off toward the latter place. After but a few miles' march they suddenly came into contact with the enemy in an undulating terrain. The Soviet infantry had entrenched itself on both sides of the highway just outside of and in two villages. At the same time we also saw at a distance of almost two miles two horse-drawn batteries rolling up. Immediately the battery which had been traveling along behind our leading company rolled off the highway and into position as fast as possible. As it was firing its first rounds the next battery also rolled up and our units were soon laying their fire on the enemy batteries which fired a few poorly placed rounds, then ceased firing. German speed and German skill had conquered.

And now the fire was concentrated on the edges of the villages. Heavy batteries gradually came in, adding their fire to that of the artillery battalion. The enemy was quickly beaten. Yet in spite of this we suffered further casualties in our advance through the close terrain. The necessity for reaching Ostrow (see Figure 2) as quickly as possible required the employment of the artillery regardless of cost, even though the unarmored vehicles offered no protection to the crews in terrain which had not yet been cleared of the enemy. Repeatedly, we succeeded in speedily breaking enemy resistance on the highway. The edge of the city was defended by the enemy. In the street-battle which now began to develop we could not help for the time being, but there was the possibility of our being able to accomplish something from position

No. 1 (see Figure 2) against the railway bridge which was to be seen on the left of the highway and at both ends of which we knew enemy field positions to be situated. One company was sent against it on foot, as the terrain is marshy in this place between the highway and the railway. We had to prevent the enemy from blowing up the bridge and so

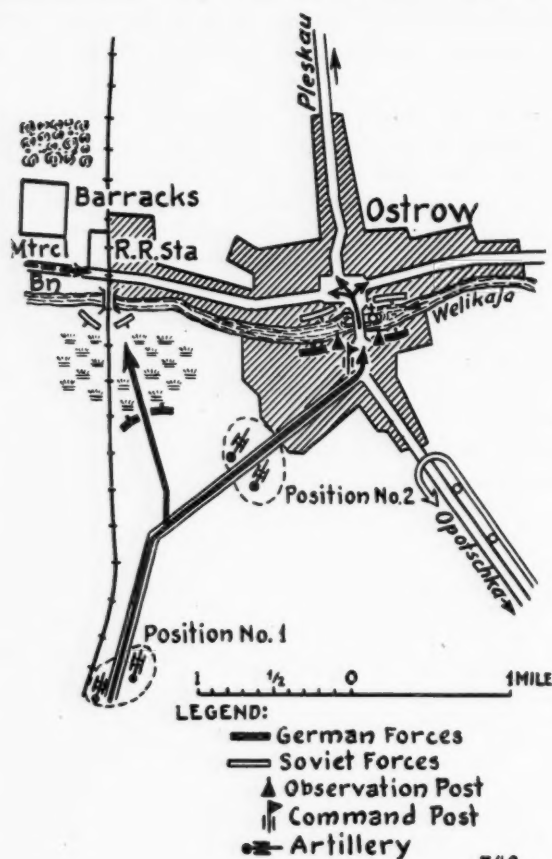


FIGURE 2.

the batteries together with the infantry guns directed slow, concentrated fire at the bridge in order to keep the Bolsheviks away from it until our own troops arrived. An impressive and accurate fire was thus laid down on the target without a very great expenditure of ammunition on the part of the battery. In fact, we succeeded in taking the bridge intact.

A motorized enemy column which was attempting to reach Ostrow over the highway from Opotschka was soon forced to retreat by the fire from the batteries.

In the meantime the riflemen who were fighting their way into Ostrow had pushed forward with their armored infantry vehicles as far as the big bridge over the Welikaja. The battalion immediately moved its command and observation posts to the houses near the bridge. The big arch bridge is divided into two parts by an island on which there is a church with typical bulbous Russian towers. On the other side of the river, some 200 or 300 meters away, a

high row of houses blocks the view into the heart of the city. Machine-gun fire was coming across the river from this location. Over there were our objectives though most of them we could not make out in detail. And so the artillery battalion's fire traveled up and down the row of houses. For a little while it was temporarily stopped because the firing positions had to be moved to a point directly on the edge of the city (position No. 2) by orders from the regiment which believed the bridges were already in our hands. A loss of time at an important moment was thus caused by an error in a report, such as can never be entirely done away with in war. Fires began to spring up in the city. In a single dash the rifle troops seized the near half of the bridge along with the island. After one last burst of fire from the artillery battalion the rifle troops then reached the far side of the river and the market place and spread out radially from this point to the edges of the city, the battery observers proceeding along with them. It was not possible until this stage to clear the enemy entirely out of the city.

In the fight for the bridge it had been shown that in spite of observation posts located close up the control of fire is very difficult in a city where a view of the objectives cannot be had. Location by means of messengers and the use of the telephone which is so often practiced in the open terrain and which is so easy, was almost impossible in this case, and the more so since, to begin with, hardly anyone from the little battery unit could be spared for this purpose. The extreme accuracy with which they laid down their fire just in front of our own lines on the other side of the river was further testimony to the dependability of the German weapons, and fortified the confidence of the rifle troops in the artillery. Really, the short range worked out favorably for us, but on the other hand, on account of the row of tall houses, we were forced to use reduced charges.

Even while we were still approaching Ostrow, the thunder of cannon could be heard from the area west of the city. The attack of the reinforced motorcycle battalion was producing an effect there. After having conquered a few difficulties in connection with the roads on the afternoon of the preceding day, this battalion had found only a two-ton ferry in place of the bridge over the Welikaja. The motorcycle battalion started ferrying their forces across without opposition from the enemy, but was finally attacked by motorized enemy forces which were trying to reach Ostrow from a northwesterly direction. But here also the attacks showed lack of plan. The battery, operating from the south side of the river, effectively supported the motorcycle battalion's defense and made it possible for them to complete the ferrying operation, and after accurate adjustment of its fire it blocked the road to Ostrow. On the following morning (4 July) the enemy had moved, and the motorcycle battalion started off for Ostrow. The

only difficulties encountered were in connection with the ferrying across of the battery since the tractors were too heavy for the two-ton ferry. On this account it was necessary to empty ammunition trucks, ferry them across, and use them as tractors. But as the third of these trucks was being ferried across, the ferry sank on account of overload. And so the motorcycle battalion started off with only two cannon. Time and again during the advance these were employed in direct fire while the second platoon of the battery, guided by radio, supported the attack until out of range of the transmitter. Then these two cannon returned to the main route of advance that had been followed by the division and succeeded the same day in rejoining the battery in Ostrow.

The bridgehead, which was immediately formed around them after the capture of the city, saw the artillery in such a position that the batteries in the vicinity of the streets which served as points of departure could at the same time serve for antitank defense. The battalion had placed two batteries in position, one on each side of the highway leading to Pleskau (Figure 2). Single cannon were brought up as far as our own front lines. The propriety of this measure was evidenced when the first enemy tank attacks began soon afterward.

But even here the attacks were not violent. Some of the cannon belonging to the battalion put as many as five tanks out of commission that afternoon. Also enemy artillery and strong formations of enemy planes took part in the fight—but they came in too late. The strongest attack took place on 5 July, when heavy tanks broke through, rolled clear to the edge of the city, and were not knocked out until they reached the firing positions of the batteries. But this seems to have been the last effort. The bridgehead was widened by means of a counterthrust that same evening. On 6 July the bridgehead was again widened after sending in another division, and on 7 July both divisions moved out of it for a new attack.

In these fights for Ostrow, around 100 enemy tanks were destroyed, half of them, it is estimated, by the artillery. Thus on 5 July, a single heavy howitzer knocked out 13 tanks within a period of one hour's time.

The attack on Ostrow showed how important careful weighing of the psychological effects of artillery may be. Many times, artillery must pass up good targets all day long as was the case on 3 July with respect to the railway targets. But in return for this the element of surprise was retained. On the other hand, however, during that same night the artillery was used, and was given orders to make itself prominent and to simulate the presence of more than really was there. Without any doubt this heavy fire during the night of 3 and 4 July deceived the enemy with respect to our strength and intimidated and surprised him—especially in the shelling of Ostrow. Then the rapid drive into Ostrow caused the rein-

forcements which were trying to reach Ostrow to retreat. In the breaking up of the enemy's defense, besides the motorcycle troops who were fighting a separate battle, the battery, which did skilful work in spite of unfavorable circumstances and which was accorded special recognition by the motorcycle troops, contributed largely to the success of the operations. Also, in the following fights it was shown by the large numbers of tanks knocked out what a decisive role the cannon can play in antitank defense.

Planes Against Tanks

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Lieutenant Colonel N. Shaurov, Red Army, in *Krasnaya Zvezda* 8 July 1943.]

IN FIGHTING hostile tanks, aviation provides considerable aid to ground troops. It is able to annihilate enemy tanks not only on the battlefield but also in their places of concentration and during their movement to the rear when use of other antitank elements is not possible.

Air attack can be especially successful when the enemy commits large masses of tanks as they are now doing [July 1943] in the battles developing in the Orlov-Kursk and Belgorod areas. Experience in these and other battles makes it clear that success of air actions against tanks is increased by careful and systematic air reconnaissance in which all types of aviation are used. Such reconnaissance may be the only means by which regrouping and concentration of enemy tanks may be promptly discovered. Detailed study from the air must be given to all sections of terrain where a hidden concentration of tanks is possible, especially on the flanks and at junctures of our units. Here it is necessary to make extensive use of large-scale air photos. Study of terrain (ravines and gullies, wooded hills, outskirts of woods, tracks leading off the road, etc.) proceeds day and night. It is very useful to "enliven" suspected areas by aerial bombing or strafing. Practice shows that such "enlivenment" reveals the enemy even when he is well camouflaged and concealed.

The commander who studies reports of air reconnaissance and air photos must not restrict himself merely to establishing the presence of hostile tank concentrations. It is necessary to try to determine the number of vehicles in these concentrations, their types, nature of dispositions, places of fuel supply and transport, presence of concealed antiaircraft elements, etc. All these data are necessary for the aviation commander so that he may make correct decisions and use effective counteraction.

Most effective against tanks is attack by fighter planes. But the use of fighter planes should not be stereotyped. The nature of the attack and the com-

mitment of various fire elements to action depends on the enemy position and the composition of his concentrated forces. For striking armored targets certain fire conditions (distance and direction) must prevail, and the proper caliber of armor-piercing shells is necessary.

Our "Ilyushin-2" fighter planes, with their large-caliber guns, can strike all basic types of enemy tanks. Pilots attack the tank most effectively from the side or rear, diving at an angle of not more than 30°. To hit German tanks with gunfire from in front is unprofitable, as the front walls of the bodies and turrets have armor of considerable thickness. Vehicles and transport equipped with armor of 10 to 14 millimeters may be freely hit by gunfire under any conditions of fire. Armored transport vehicles generally do not have roofs and have low walls on the sides. For this reason even machine-gun fire of the assault plane is effective against personnel carried by these vehicles. For bombing tanks it is expedient to use bombs of medium caliber with instantaneous detonators. Here it is necessary to obtain either a direct hit or, at any rate, a near-miss.

It is essential to consider the armament of our planes and contrast it with the qualities of hostile combat vehicles. Planes having armament of larger calibers are designated for action against tanks and other strongly armored targets, and planes with armament of less penetrating power are used for the annihilation of personnel, technical equipment, etc.

The order of attack by fighter planes depends on the position of the targets, whether the tanks are in column, in positions of departure, in places of concentration, or in combat formation. For example, it is best to attack a tank column from the rear or side, which permits the greatest fire effect on the armor. If tanks are dispersed in movement, it is necessary to designate a definite target for each unit of fighter planes, at the same time avoiding scattering. Part of the planes must be designated for silencing hostile antiaircraft elements.

When hostile tanks are in places of concentration, bombing is expedient in addition to gunfire. Here the commander executing the attack must also keep in mind the disposition of enemy fuel supplies, provisions, and personnel.

Having good armor protection, our fighter planes can successfully attack German tanks on the battlefield. Judging from experience, one of the best starting positions for attack is the combat formation in the shape of a closed circle above the hostile tanks. If the targets are dispersed, such formation permits each flier to choose a target independently and attack it several times. The attack is delivered from the rear for the following reasons: first, this is most advantageous against armor; second, the tanks cannot take counteraction against attacking planes because their guns are directed toward our ground troops; third, attack from the rear gives the at-

tacking plane a chance to glide to friendly territory in case it is hit by antiaircraft artillery fire.

When enemy tank units assume the defensive, damaged tanks are dug into the ground as stationary firing points. It is not the business of assault planes and fighters to attack these targets, for they can be attended to by ground troops. The main attention of the fliers must be directed toward moving tanks, especially those not reached by antitank artillery fire.

Success of fighter planes acting against tanks depends to a great extent on how well the flying personnel knows enemy tank types and how well it can recognize them from the air. It is essential also to master one's own weapons thoroughly, to know how to conduct accurate aimed fire in order to hit such a relatively small and mobile target as a tank.

Battle For a Hill

[An article by Captain E. McManus in *An Cosantóir* (Dublin, Eire) June 1943.]

IT WAS somewhere in Russia, but where or when makes no matter. And who was which and which was who is inconsequential to the story. Sufficient it is that there were Attackers and Defenders—the A's and the D's—and that they were fighting for a hill.

The A force on the flanks had succeeded in making some progress and in these circumstances the hills might have been by-passed. But the A command considered that to leave such a powerful threat in their rear would have been unjustifiable.

It was a tough proposition. In itself the hill was a natural fortress. It commanded a view of more than ten miles on every side, so that all approaches could be kept under fire. Its natural strength had been reinforced by an elaborate system of protective works—armored fire-points and trenches fortified with layers of logs.

The A's sent in their tanks on the right or on the left, but their coming was so closely observed that the antitank guns quickly had their range and blast them back. The infantry following up were drilled with artillery fire from the front and battered with bombers from the air. Every attack was nipped in the bud; and even when some progress had been made the D's were so well informed of its direction that they had only to pull out tanks, or artillery, or motorized infantry from their reserves behind the hill and concentrate them at the threatened points.

Daylight brought nothing but failure. Finally the A command decided to pit their chances of success on an assault by night. The prospect was by no means encouraging, for though it was night the covering cloak of darkness was thrown back by the light of dozens of flares on the hill and hundreds of

bonfires on the plain. The eyes of the defense could still observe.

The A artillery and mortars opened up with an intensive preparation. The infantry went forward, yards, tens of yards, hundreds of yards. They reached the hill—almost. Suddenly a mad carnival of flares was showered from the skies. At the same time a blazing barrier crackled across their front—the D's were pouring petrol and oil on the dry grass and the steppe was burning furiously. The infantry was momentarily halted, halted long enough to allow the defenders to regroup. Once more they succeeded in delivering a timely counterattack, and once again the attack was broken before it could gather momentum.

Wiser from this rebuff, the A's tried again, this time with a new maneuver. A group of tanks made a thrust at the enemy right. From long range, trench-mortars and artillery forced the defenders into the cover of their trenches and dug-outs. The D artillery switched to meet the tank attack and up went the planes to spot the infantry in the wake of the tanks. But the infantry wasn't there! The planes circled round, searching, searching, but of foot-sloggers in the area not a sign could they find. They went off to search another sector.

At this moment the A artillery lifted from the forward trenches and concentrated on the depth of the defense. And at this same moment the infantry appeared from nowhere. In their hitherto camouflaged trucks they had been moved forward to assault positions. One detachment went for the enemy left, another for the center. With a neatly timed effort they reached the height before the D's had recovered from the artillery barrage.

Quickly the forward defense points were overrun. Lobbing grenades shattered the shelter of the trenches and rapid-firing tommy guns and bayonets dealt death abundantly. The main resistance broke before the breathless onslaught. Even then the attack did not rest on premature laurels. Other tommy gunners penetrated deep to the rear and overwhelmed the batteries and reserves.

Faced with complete debacle the D's in an effort to stabilize the position withdrew from the hill. The A tanks massed forward to assist in mopping up the broken remnants of the defense and consolidate the success.

So ended the battle for a hill. The lorry-borne attack had succeeded though it was carried out by less than one-tenth of the forces employed in previous unavailing efforts. It succeeded mainly because it was unorthodox and therefore surprising. It was merely a new use of old weapons, a departure from the set prescription of tanks first and infantry following. The tanks drew the bulk of the defender's fire in one direction while the infantry came in in another. Added to this was the perfect coordination of the supporting artillery fire with the in-

fantry advance on the hill. And finally there was the exploitation of the initial success—the infantry and artillery smashing the foundations of the defense in the rear before a counterattack could develop, and the tanks swarming in to stake their claim.

Ski Detachment in Offensive Combat

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article in *Krasnaya Zvezda* 2 December 1942.]

EXPERIENCE on the Karelian front shows that ski detachments, because of their mobility and great maneuverability, play a fundamental role in offensive combat. They disperse the hostile formations, disorganize the enemy's administration, interrupt his communications, and hinder bringing up reserves. However, all this is possible only on condition that the ski troops are well trained and used correctly.

It has been established by experience that in attack the ski detachment is most useful for rapid thrusts on the enemy flanks and for deep encirclement. However, in completing an encirclement or envelopment it is essential to remember that the detachment itself may be subjected to attack from the flank or from the rear. For this reason it is necessary to set out, besides circular security, forces in observation in directions which are particularly threatened.

The ski detachment acts in the main on the move. It makes only a short halt at the line of departure. A long stop may lead to the detachment's being detected. But surprise is the most important thing for ski troops. For them to show themselves too soon is especially disadvantageous. Consequently the whole theory of combat must be based on action on the move.

Of course an attack without stopping to reorganize, particularly after a long march, is a very difficult matter. When the detachment is led ineptly the men tire, and the attack then lacks coordination. It is necessary to organize the march so that strength is preserved for combat. Depending on the distance, the commander sets a definite rate of movement and a certain manner of stops for relieving the ski guides. Besides that, the alternating of soldiers pulling the machine guns and trench mortars is arranged.

The formation of the column of ski troopers depends on the combat task to be fulfilled, the composition of the detachment, and the character of the locality. The fire elements must be forward and in the center, near the commander of the detachment. In case of necessity it will then be possible to produce centralized fire, striking the enemy with its full mass.

In the immediate vicinity of the enemy the most

useful combat formation is the wedge. The guiding group moves in the indicated direction; two groups move in echelon at the rear at an interval of 300-400 meters. The commander of the detachment moves with the fire elements behind the first group, covering the rear with soldiers armed with automatics. Such a formation makes it possible to parry the thrusts in case of enemy attack on the right or left flank. But the situation may dictate a different arrangement in the combat formation.

With regard to the details of directing the detachment in attack in a wooded region, we cite an example for better characterization of the problem. The ski detachment received the task of forcing the enemy out of an inhabited place located in a forest. The detachment was observed on the approaches to the inhabited place. Nevertheless, the commander decided to attack without stopping to reorganize, not giving the enemy opportunity to adjust himself. One group struck frontally, two from the right and left sides. The signal for the attack was the mortar fire directed at the enemy firing positions. At the moment when the soldiers approached the outskirts of the village a sound signal was given and the battalion trench mortars shifted fire into the depth of the enemy's defenses. In the surviving separate firing positions on the outskirts of the village there were only company trench mortars. Soon the enemy was disrupted and began to retreat. Our commander indicated pursuit objectives with tracer bullets from a machine gun and with radio signals. This example clearly shows the importance of skilful direction of fire and the use of radio and sound signals, which had been learned by all commanders, even the juniors.

In the condition of our Karelian theater the movements of tanks in conjunction with ski troops are not very likely. Tanks may join the detachment only when there is a road nearby. More frequent are the joint activities of ski troops and aviation. The latter bombs the forward edge of the defense of the enemy and at the same time the ski troopers move forward toward the object of attack. They attack just when the aviation ceases bombing so that the enemy does not recover himself.

In winter, supplying munitions and food is a great difficulty in attack combat. It is frequently necessary for the ski detachment to carry on combat when separated from its units. As a result the obtaining of munitions and food becomes complicated. It is best to transport ammunition and food on ski-sleds. If there are roads in the combat area it is possible to transport loads on horse-drawn sleds, and sometimes even by automobile.

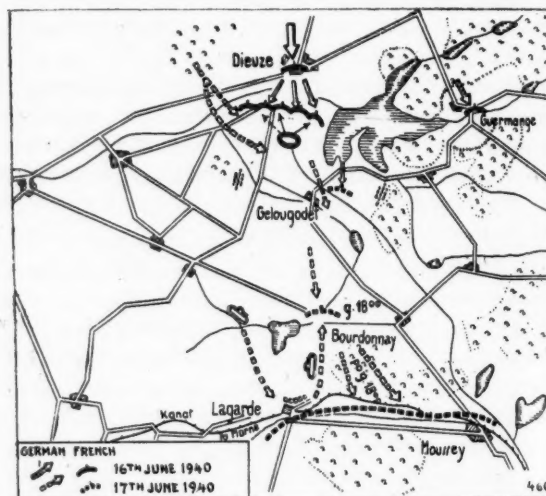
Execution of a Holding Mission

[An extract, translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Polish article, "The Role of the Commander in Battle," in *Bellona*, monthly publication of the General Headquarters of the Commander in Chief of the Polish Army, London.]

General situation.—The 1st Grenadier Division of the French Army, after a night withdrawal from north to south in contact with the enemy, organized temporary defense beginning at dawn, 16 June 1940, along the general line Dieuze-Guermange-Fraburg forests (east of Guermange).

The 2d Battalion of the 2d Grenadier Regiment organized defense at the edge of the woods south of Dieuze. Dieuze itself, being the advanced point of resistance, was defended by French units.

Situation in detail.—At 1800 on 16 June the commander of the 2d Battalion, 2d Grenadier Regiment, received a verbal order from his regimental commander as follows: "On the night of 16 June our division, with two battalions serving as security, is withdrawing south for the purpose of organizing defense on the canal and the river Marne along the



general line Legarde-Moussey. Your battalion will, from 2400, 16 June, take over the defense of the entire sector of the 2d Grenadier Regiment. You will hold the enemy until 1600, 17 June. East of your battalion a similar mission will be executed by a battalion of the 3d Grenadier Regiment; west of your battalion there will be a French battalion similarly engaged. Artillery support will be provided until 1100, 17 June, by two batteries. After this hour, by one battery only."

Course of action.—At dawn, 17 June, the 2d Battalion, 2d Grenadier Regiment, was grouped as shown on the sketch. The battalion reserve consisted only of one platoon plus one machine-gun squad. At 0500, after a 15-minute artillery preparation, the

German attack began. It broke down under the fire of the battalion.

At 0900, very heavy enemy artillery fire began. It continued about one hour, after which the enemy resumed the attack and broke into the right wing of the defense, whence he was thrown back by a counterattack of the battalion reserve.

Almost simultaneously behind the left flank of the defense there appeared enemy units (French units had withdrawn without a warning, thus exposing the left flank of the battalion); the battalion commander received a report that the enemy was already at the southern edge of the woods; friendly artillery ceased fire.

The battalion commander estimated that he was flanked in the west and was being pressed against the lake. In this situation he decided to break through southward. The decision was executed. Loose groups maintaining contact with the enemy took up positions on the northern edge of Geloujodet and retained them from 1400 to 1600, holding back strong enemy pressure. Because of further enemy flanking movements the battalion commander decided at 1600 to withdraw in the direction of Bourdonnay. The withdrawal took place under difficult conditions in contact with the enemy. At 1800 the battalion took up positions on the hills north of Bourdonnay where it stopped another enemy attack. Unfortunately at about 1830 shots were heard in the rear, and in a moment enemy tanks attacked both front and rear of the battalion. The situation was hopeless; the remnants of the battalion were completely encircled. The battalion commander did not give up the battle but gave the order to break through in small groups behind the Marne Canal. At dawn about a hundred men assembled on the southern bank of the canal. Of twenty-two officers of the battalion, four were there; the others had been killed or wounded, a few having been captured by the enemy.

Evaluation.—The battalion executed its mission in full, holding up the enemy as long as ordered.

Messenger Service in the "Schnelle Truppen"

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by 1st Lieutenant Reinhardt, German Army, in *Die Panzertruppe* April 1943.]

The "Schnelle Truppen" of the German army are highly mobile task forces capable of extensive independent action (TM 30-255).—THE EDITOR.

THE SUCCESSES which our forces have been able to score in the campaigns of this war can be credited largely to the readiness for action and the striking power of our *Schnelle Truppen*. These troops are

very efficient because of their composition, their strong armament, their great speed, and their ability to travel over any terrain, and also because of their protection by armor. However, there exists a contributing factor in these accomplishments which generally is not given sufficient attention. That factor is the manner in which the messenger service is accomplished in the *Schnelle Truppen*.

The following example shows how the order of a higher command set in action a complete, faultlessly interacting command machinery which by means of oral commands, as well as by telephone, radio, motorcycle, and foot messengers, transmits the will of the commander in the most rapid manner.

The commander of our tank grenadier regiment has halted his tank beside the road along which the division is advancing. The regiment is ready for action and is at the disposal of our armored division in order later to take advantage of the attack of a now engaged tank regiment and to drive into the rear positions of the enemy.

The noise of fighting in the distance has increased. A motorcycle with a side car comes hurrying out of a cloud of dust and stops beside the vehicle of the regimental commander. The administrative officer from the brigade leaps out and reports to the commander; "An order from the brigade! The leading combat group has broken its way through the enemy's lines. The tank grenadier regiment will pursue and overtake the enemy and will form a bridgehead at 'X' to a depth of 50 kilometers in the rear of the enemy's front."

The regimental adjutant has opened his map case and with rapid pencil strokes plots the new situation on the map. Meanwhile the commander is preparing his orders and with the help of the map determines the route of march.

The regimental commander now curtly transmits his orders by radio to the 1st and 2nd battalions and in a few minutes the battalion commanders are in possession of this radio message. There is one main factor now—speed in carrying out the operations! Therefore, for the further dissemination of the orders the most rapid means is used, radio-telephone. Since the messages that are being transmitted will be quickly translated into action, there is little danger in the overhearing of these messages by the enemy, a thing which may easily happen. Radio orders are given to the companies from the vehicles of the battalion commanders. On the basis of these radio messages the companies form themselves in marching order coming out of the broad assembly area. The battalions set out to fulfil their missions.

In the meantime, reports concerning the enemy have been sent in to the regimental commander from the armored regiment by means of direct connection. This is marked on the map and rounds out the picture that has been made of the enemy. There arrives another radio message, picked up by the regimental

communications section, from the motorcycle battalion to the division. The motorcycle battalion has assumed a hedgehog position on the right and in so doing has eliminated the threat to the flank of our regiment from the very start.

Again a radio message directed to the division by a reconnaissance plane has been picked up by a special receiving set at regimental headquarters. The enemy has used tanks to relieve the pressure that is being brought to bear on him. A radio message from the regiment to the battalions gets a head start on the enemy tanks so that these, when they appear, are met and annihilated by the armor-piercing weapons.

In the meantime the tank grenadier battalion has attacked the enemy. The enemy tries in vain by means of hurriedly summoned forces to hold against this attack. They have nothing, however, with which to oppose the violent attack of the tank grenadiers. In accordance with the orders which company commanders and platoon leaders give to their groups by means of radio, numerous weapons are quickly brought into position.

The regimental commander has gone forward with his command echelon in order to obtain a personal impression of the combat situation as it stands. The regimental radio receiver continually brings in reports of further gains. This places the commander in a position to issue his orders in conformity with the new situation.

The battalions have reached their assigned objectives and have formed the bridgehead. There are telephone lines running from the battalions to the company command posts for the purpose of a more rapid mutual understanding, for enabling the commander to discuss matters with one another, and for the exchange of reports concerning the enemy.

Our tank grenadiers are forced to dismount from their vehicles when seizing enemy nests with armor-piercing weapons. Then motorcycle and foot messengers are employed who carry out their missions, taking advantage of the terrain.

In a case such as this we must meet time and again with the so-called "saddle order" which, taken over from the cavalry and handed over from the saddle, is suited for translating the will of the commander into action in the shortest time. The horse has now been supplanted by the motor car in battle, especially by our armored vehicles. The speed and energetic action, however, have been transmitted on down so that today the saddle order has become one of the most characteristic types of orders of the *Schnelle Truppen*.

Furthermore, the German order omits, as its most essential characteristic in comparison with the form of orders of foreign armies, the assignment of missions. The working out of the assignment in conformity with the general plan is left to the subordinate commander. By means of this, in the tactical situa-

tions of the *Schnelle Truppen*, which frequently change rapidly, the correctness of decision is enhanced, and by the direct participation of all commanders, even when sudden changes in situation occur, the assurance is obtained that they all give their orders in a way that will benefit the action as a whole.

The Important Factor In Infantry-Artillery Cooperation

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article in *Krasnaya Zvezda* 30 June 1943.]

ON MANY sectors of the front there is now relative quiet. Taking advantage of this, our units which are in direct contact with the enemy are organizing their positions. It must be supposed that the German troops also are reinforcing their positions, erecting more solid defensive installations. At the front the situation has developed wherein any action, from a reconnaissance engagement by a small infantry unit to a decisive attack by large units of combined arms is inevitably associated with the task of overcoming enemy obstacles and destroying positional fortifications. This increases to a still greater degree the importance of artillery fire in attack and demands of the infantry still greater skill in relying in all its actions on the crushing power of our artillery.

Experience of war teaches that attacking infantry must not become separated from the shell-bursts of its artillery. This is one of the fundamental factors in cooperation of infantry with its supporting artillery. Even in the first World War, when there were no tanks on the field of battle and when the task of crushing and destroying hostile defenses lay wholly upon the shoulders of the artillery, it was proved in hundreds of instances that every delay of infantry units in executing the attack and in keeping up with artillery fire was inescapably associated with the defeat of the attacker. Today, in addition to artillery, tanks and planes also help the attacking infantry in crushing hostile defense. Besides that, in the composition of infantry units the quantity of mortars and automatic weapons has increased immeasurably. But all this in no degree decreases the significance of the basic rule of cooperation of infantry with artillery which states: *to attain success in attack, press close to artillery fire* in every move forward and rush violently to attack hostile fortifications right after the bursts of the artillery shells.

When artillery conducts fire on hostile fortifications, German soldiers move from the front lines into dugouts or lie on the bottom of trenches. In open areas observers remain on duty at machine guns and artillery guns.

At this time the enemy is insufficiently prepared for repulsing our attack. If the attackers reach the

enemy while he is in hiding, this definitely means that they will attain a victory with small losses. If the attackers miss the moment when the artillery fire is transferred, or for some reason delay in executing the attack, enemy soldiers leap out of hiding and take their places at machine guns and artillery guns. Then the attack may easily stall.

In attack it is the duty of every infantryman to take full advantage of artillery support and to rely skilfully on the full strength of its fire. Commanders of infantry units must consider the sequence of supporting artillery fire both in determining the technique of movement by the infantry and its accompanying weapons and in selecting the line for attack. They are obliged to plan the movement of companies, platoons, and squads and their use of infantry weapons and mortars in coalescence with the fire of the artillery. To rush to the attack of enemy positions and to force him to engage in hand-to-hand fighting at a moment when he has not succeeded in recovering from the fire of our artillery—these are the tactics of every infantry unit which skilfully utilizes artillery support.

The infantry must also use its own fire elements in strict conformity with the artillery fire. It may happen that the artillery, in transferring fire to a new target, will make a considerable jump forward. Between the attacking waves of infantry units and the bursts of the artillery shells supporting them there will be considerable intervals where surviving German firing positions will revive. These may come down on attacking infantry with destructive fire at close range. In such cases the infantry must take care of the enemy with its own means, trying not to give the Germans opportunity to emerge from the trenches, driving them to cover, and crushing their fire elements. Infantry units must supplement artillery fire by fire from rifles, automatic rifles, and machine guns, bringing this fire to the highest degree of intensity in the decisive moments of the engagement, especially during the attack when the artillery transfers its fire to bear on the second echelons of German fortifications.

The law of attack is to obtain at one and the same time incessant and powerful fire action on all the attacked firing points of the enemy, to keep each of them under destructive fire up to the moment when hand-to-hand struggle ensues. All hostile targets from which the artillery intends to transfer its fire must at once be taken under the fire of mortars, machine guns, and rifles. Dozens of shells and thousands of bullets must be fired by the infantry in a solid flow on each hostile trench and in the region of each enemy firing point so as not to permit the Germans to emerge from concealment and to fire on the attackers. The nearer the infantry approaches to the enemy trenches, the stronger must be its fire action. The crushing of German positions by fire, begun by artillery, or by artillery and aviation, must continue

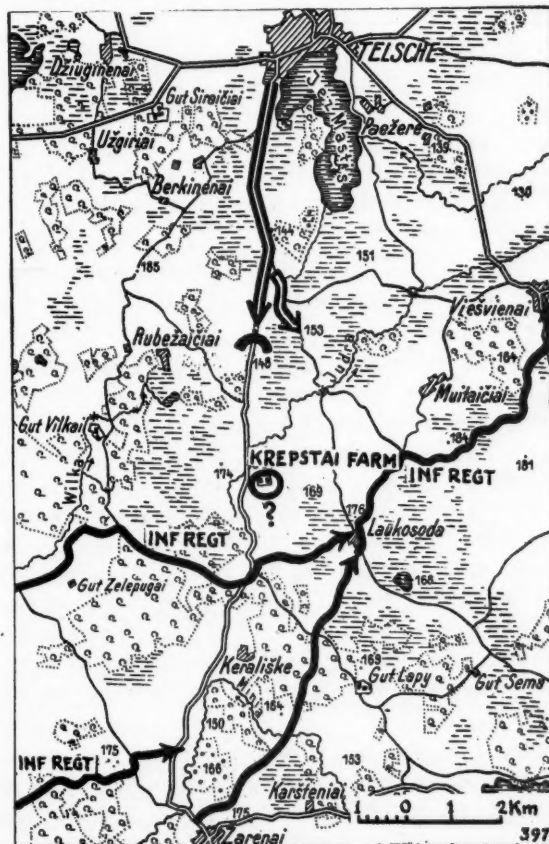
incessantly until the hand grenades of our infantry fly into the hostile trenches, until the bayonet takes up its work.

Thus, in front of the attacking infantry, as if anticipating its advance, a powerful wall of fire must move all the while. Attacking troops, by means of the artillery fire, aviation, and infantry, smash as if with a hammer the obstacles rising in the path of advance. This is their shield of fire which forces the enemy to crawl to cover and hide his own fire elements and thereby protects our infantry from hostile blows. The chief role in supporting the infantry attack belongs to all types of artillery. Infantry must skilfully take advantage of artillery fire, relying on it in every battle. In attack, infantry must press close to the shell-bursts of the artillery supporting it.

Repulse of a Tank Thrust

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by 1st Lieutenant Friedrich, German Army, in *Militärwissenschaftliche Mitteilungen* March 1943.]

FOR TWO DAYS our company of the 3d Motorized Engineer Battalion had been pursuing the enemy,



who had been beaten in the frontier engagements in Lithuania. We had hoped to get at least a few hours' rest when, at 12:30 o'clock, the battalion adju-

tant brought the following order from the division: "3rd Engineer Battalion . . . less 1st platoon will provide security on the north flank of the division along the Zarenai-Telsche highway in the neighborhood of Krepstai farm against hostile tanks which are expected from Telsche. Your company will relieve the advance detachment now providing security. Greatest speed ordered!" The adjutant also handed over a certificate authorizing the company to pass any other troops on the road.

Although urged to hurry, our commander took time to get the company ready for combat: platoon and group leaders were given instructions, machine guns and rifles were loaded with S.-m.-K. ammunition (pointed ammunition with steel cores), and contact mines and pressure rails were laid ready on the truck belonging to the group. The antitank-rifle unit with two antitank rifles and a side-car motorcycle went ahead as security. This precaution was later rewarded.

The company worked slowly forward over the miserable, narrow road past columns of horse-drawn vehicles six kilometers long. When the head of the column finally reached the highway running to Zarenai (lower edge of sketch) only the company headquarters detachment and one group from the same company were there; the rest had been squeezed out of the column somewhere along the route.

The company gradually assembled. The train vehicles were placed in the center of the column on account of sniper activity. We started out through Zarenai in the direction of Telsche. At first the road was completely clear, but just northwest of Zarenai we ran into parts of our division which were on the way to Laukosoda.

Outposts of the advance detachment which should have been in the neighborhood of Krepstai farm were nowhere to be found.

The company was brought forward as far as a deep-cut valley 300 meters south of Hill 148. The company commander intended locating the security forces on Hill 148 because of the good observation afforded from there in the direction of Telsche, and he went ahead on foot with his platoon leaders to locate these forces. While they were working out the situation, a platoon leader suddenly announced: "From the direction of Telsche, a great deal of dust and the sound of motors." With field glasses a long train of dust could be seen, the beginning of which must have been somewhere in the neighborhood of Hill 144.

The antitank-rifle troops who had gone ahead were signaled to return immediately and go into position on the north slope of Hill 148. The two platoons started off at double-quick time and went into position facing to the north on the hill and to the right and left of the highway. An emergency road block was erected with contact mines, and the lead-

ing group truck was placed crosswise on the highway. The empty train was ordered to remain completely under cover in the deep depression of the valley, and the Master Sergeant and the truck drivers prepared the train for defense.

An order to turn and retreat in face of the oncoming tanks would only have led to great disorder.

The last man was hardly in position when the first of the hostile tanks suddenly appeared on the highway about 1200 meters ahead of us. At intervals of a hundred meters two more tanks appeared, then an armored scout car followed by more tanks of various types. In all, seven tanks and one armored scout car were rolling toward the company.

The company had never yet gone through a tank attack. Now the question was, would they rely entirely on their own resources and without any antitank cannon hold in the face of the attack, or would they lose their nerve? The company commander took charge of opening fire. Tension was rising rapidly. When the first tank was 500 meters away the command was given to fire. "At the first tank; range 500 meters; fire at will!" The tank slowed down somewhat, turned its turret right and left, and fired into farm buildings and sections of woods in the foreground. The other tanks did the same. It was clear that they had not recognized our position. But a few minutes later the machine-gun bullets and shells of the rear tanks forced us to cover.

After fire combat had continued a while there came the report: "The leading tank is knocked out; the crew is leaving it!" And so the crisis had passed. The company felt superior to the tanks.

Now the thing to do was to economize with the costly, sharp-pointed, steel-core ammunition. Long intervals in fire were ordered; then the fire of all weapons was suddenly concentrated on an accurately designated target.

The tanks had gone off the highway to right and left. Some had stopped in the highway ditches, some had sought shelter in clumps of brush and bits of woods. Then a second tank was knocked out. The other tanks continued to fire in a confused manner about the terrain, but gradually all adjusted their fire on the company's position.

Then came a report from the right flank: "Half to the right at a distance of two kilometers, a great deal of dust and the sound of motors!" We could expect a second attack and a simultaneous flank attack over Hill 153. The troop commander was sent back to bring up antitank troops. The trail of dust on our flank moved slowly forward. Fire from the halted tanks in the brush kept coming faster and more accurately. We hardly dared expose ourselves any longer. Gunner No. 1 of one antitank rifle was severely wounded by a direct hit.

Finally the first two antitank guns arrived and were placed under the orders of the company. The

Russians moved onto the highway again. Apparently they did not trust the terrain. Our antitank troops were now in action. At the very outset two tanks were knocked out and forced to stop and a third was set on fire. The attack had been repulsed and the trail of dust on our flank disappeared to the north.

The Russians now attempted to drag their disabled tanks away by means of long chains. While these operations were going on the antitank gunners also obtained hits, but results could not be determined on account of gradually approaching darkness. Until 12:30 o'clock the Russians covered Hill 148 with machine-gun fire and high-explosive, armor-piercing shells of 4.5-cm caliber, firing from their tanks in concealed firing positions. Then the fire ceased.

The next morning a scouting detachment learned that Telsche had been evacuated by the enemy during the night and that the division reconnaissance battalion, having come in from the west, had occupied the city in the early hours of the morning.

The company had fulfilled its mission. Eight enemy tanks had been knocked out, and the attack which had threatened the flank of the advancing division had been warded off.

German Antiaircraft Artillery

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Lieutenant Colonel V. Kotelkin, Soviet Army, in *Krasnaya Zvezda* 3 June 1943.]

THE MAIN WEAPONS of German antiaircraft artillery armament are the 88-mm, the 37-mm, and the 20-mm automatic guns. These calibers are intended primarily for antiaircraft defense of first-line troops.

The 20-mm gun, model 1938, serves for fire on air targets at distances up to 1500 meters; the 37-mm gun, model 1936, to 2500 meters; and the 88-mm, to 11,000 meters [probably refers to horizontal range]. The practical speed of fire of these guns is respectively 120, 60, and 20 rounds per minute. There are double and quadruple 20-mm and 37-mm guns, and also MG-34 machine guns (caliber 7.92-mm) adapted for firing at ranges up to 500 meters.

In recent times the German antiaircraft weapons have been equipped with protecting shields and used for antitank fire at distances up to 800 meters.

Tank and motorized units are equipped with mobile antiaircraft guns mounted on light half-track transporters. In tables of organization of German infantry divisions, antiaircraft artillery is not provided. Only a few of them have one 20-mm antiaircraft battery within the division antitank battalion.

To an army engaged in an offensive operation there is assigned an antiaircraft division of two to five regiments; to a corps, an antiaircraft regiment of two battalions; to a Panzer division, a light or mixed

battalion consisting mainly of guns of 20-mm and 37-mm caliber. [An infantry division is not likely to be allotted more than a battery.—Ed.] One battery consists of three platoons of four guns in each platoon.

For repelling attacks by dive bombers, the Germans dispose the fire positions of the antiaircraft guns directly alongside the object defended. Planes attacking from grazing flight are combatted by batteries disposed around the defended object.

On the march the Germans try to make sure, during movement of units through regions exposed to air attack (gorges, crossroads, etc.) that antiaircraft artillery should be available at these places ready at any moment to open fire. For the fulfillment of this task the antiaircraft platoons are usually between the advance guard and the main body. If a unit completing a march reaches the threatened area and the antiaircraft units have not yet deployed, the latter by-pass the column on the shoulders of the road.

During the march of motorized units the antiaircraft platoons proceed in the column itself. In order that the guns of each half-platoon should not hinder each other in firing, three or four motor vehicles are placed in the column between them. The units are warned by radio of the appearance of hostile planes. In case the motorized units are protected by only one antiaircraft battery, the latter proceeds at the head of the column for prompt deployment in places especially vulnerable from the air.

In offensive combat, units of the antiaircraft artillery occupy firing positions with the purpose of covering the assault group of the troops: first the deployment of the main mass of artillery, the concentration of tanks, and command posts are given protection. Another task of the antiaircraft gunners is the support of their own reconnaissance and bombardment aviation operating against the combat formations of the hostile infantry.

Upon the appearance of hostile planes above the German front-line positions, the Germans open fire with all their antiaircraft artillery. From the density of antiaircraft fire it is often possible to judge where the Germans have their main concentration of troops.

In the process of attack itself, the missions assigned to the antiaircraft artillery include both antiaircraft defense of troops and repelling counterattacks by enemy tanks. Individual antiaircraft batteries are especially assigned for combatting enemy firing positions and tanks.

In case of attack involving the forcing of a water obstacle, the places of crossing and the troops engaged in the crossing are covered as well as possible by small-caliber antiaircraft artillery and antiaircraft machine guns. Part of the antiaircraft guns are transported to the opposite side of the streams but the main mass of guns remains on the shore from

which the crossing was made. The service of air observation, reports, and communications is organized by the elements of the attacking troops.

Upon breakthrough of the forward edge of hostile defense the mobile antiaircraft artillery, followed directly with the mobile groups, constantly protects their activities. Since the divisional artillery in such instances usually lags behind the tanks and the motorized infantry, individual antiaircraft batteries receive the task of combatting ground objectives.

In the attack, each unit, using the armament at hand, independently organizes antiaircraft defense. Massed rifle and machine-gun fire is considered most effective against planes operating at altitudes up to 500 meters. The Germans assign the attached antiaircraft artillery to the protection of especially important objects such as bridges, defiles, main strong points, command posts, rear installations, and crossings; they by no means distribute them evenly along the whole front. The most important concentration of troops is protected by dense fire. Secondary sectors are left without supporting elements. Antiaircraft artillery is employed by platoons. The use of separate guns is considered to be ineffective.

In defense, the antiaircraft artillery is often disposed in the immediate vicinity of the front line (1 to 1.5 kilometers), meeting the hostile planes in cooperation with friendly fighters. For example, in the northern Caucasus this cooperation was evidenced by the fact that with the appearance of our bombers and attack planes the German antiaircraft artillery tried to break up the combat formations of the planes and to isolate some of them. As soon as one of our planes lost its position in the formation, it was attacked by hostile fighters from above and laterally.

The battery takes up position in combat formation by platoons in a triangle at a distance of 1.5 kilometers between the platoons. Each platoon also is disposed in a triangle, the distance between guns being 200 to 250 meters. Firing positions are selected as far as possible in directions that may be threatened by tank movements so as to be able to take part in repulsing tank attacks without changing position.

Thus the Germans' tactical use of antiaircraft guns in different kinds of combat is varied. A further proof of this is the fact that the supply of combat ammunition is made up of 60% time-fuze projectiles, 20% fragmentation shells, and 20% armor-piercing shells.

Regulations on the employment of antiaircraft batteries also deal with problems of protection of objectives from air attack, problems of antitank defense, and fire problems related to action against other ground targets. The use of antiaircraft guns for firing on ground targets follows the principles of the use of regimental [infantry] and antitank guns. In battles at Sevastopol and Stalingrad the Germans

made extensive use of antiaircraft guns against ground targets, including even artillery, thus attempting to make up for their deficiency in artillery.

The West Wall on the Atlantic

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article by Werner Höfer, Todt Organization War Reporter, in *Das Reich* 18 April 1943.]

WHILE at several points along the coast stretching over 1,600 miles from the Bay of Biscay to the North Sea new excavations are continuously being dug, new concrete bunkers are being poured, and defensive armaments are being installed, the troops, as was the case with the West Wall, have moved into the completed fortifications in the immediate neighborhood. Today, in order to give a good account of himself as a soldier, if this should become necessary, the Todt Organization man takes not only his tools but also his gun to the building sites.

"If the campaign in the West had not been decided so swiftly, we should probably still be adding to the West Wall," asserts one of the foremen who helped build the fortifications of the Eiffel mountains and is now in Brittany with his units, "because a line of fortifications is not completely finished even when it has long since been prepared to reach the maximum defensive effort." This remark by an expert also applies to the Atlantic Wall which has been laid, without a break throughout its length, around the Western fringe of the continent.

Every day the fortification system is further consolidated and improved. Even at places where the German leaders take defensive measures, they do not neglect the laws of a dynamic conception of battle whose antithesis found expression in the Maginot complex of the French. The construction of the fortifications is also adjusted to the conception of a far-seeing conduct of war. When the extensive coast from the Pyrenees to Cape Nord fell into German hands, it was used offensively from the first; for German U-boats used the bases that became available here for successful attacks against enemy shipping.

The Führer commissioned Dr. Todt, with his tried men and methods, to build reliable shelters for the U-boats, invulnerable against the heaviest artillery bombardment from the sea and the most violent attack from the air. These U-boat pens have proved themselves admirably. Heavy British bombs have fallen on top of one of these pens without causing the yard workers inside to lay down their tools even for a moment. Such U-boat pens can be found on all important locations along the French coast. But here also there is no pause. It has been reported that the Todt Organization constructed air fields in the occupied western territories, emplaced long-range bat-

teries, and generally contributed in many ways to protection of the Atlantic and Channel coasts. Additional tasks were recently assigned to the Todt Organization along the French Mediterranean coast. What the Todt Organization created as if by magic along the whole coast, besides the U-boat pens, is the Atlantic Wall itself.

As in the case of the West Wall, this is not a rigid line but a systematically organized structure of strong points. Their potential fire power can be combined in such a way that there is practically not a single point along the whole Atlantic and Channel coast which could not be covered by the concentrated fire of all guns. Here too the principle of overlapping fields of fire has been retained. Every soldier guarding these ramparts is sheltered by a cement and steel shield which affords him and his gun excellent protection against enemy bombardment. These defensive installations at the same time give the troops an opportunity for operational development. At all points where a landing attempt appears particularly tempting, exceptionally comprehensive and thorough defensive measures have been taken. The U-boat bases—interpreted broadly, the river estuaries, ports, and finally the U-boat pens themselves—are favorite targets of enemy attacks. This has been proved by the unsuccessful attack in St. Nazaire.

The normal defensive unit is the strong point, which is composed of different installations ranging from the heavy concrete fort to the Tobruk-type dugout. Artillery, infantry, and antiaircraft weapons of all types and calibers have been installed here, among them the most modern products of German armament production such as an extremely effective antitank gun and a machine gun which is especially effective in defense. These fortified positions are not inferior to the U-boat pens in their ability to resist artillery and air bombardment.

The installations of such a strong point are in continuous contact with each other. Should the enemy, after a successful landing, concentrate all his attacks against one strong point or even isolate it, the defenders will be able to hold the position independently. How long will depend on the number of soldiers and the quantities of arms, ammunition, and provisions. In any case, they will hold out longer than the Polish, Western, Norwegian, and Balkan campaigns taken together.

A person inadvertently passing near a strong point would, to be sure, see practically nothing. All installations have been dug deep in the earth, and most of them have been concealed with the best camouflage—vegetation. In the direction of the ocean these strong points are supplemented by the usual defensive installation such as barbed-wire obstacles and tank traps.

It is quite difficult to visualize the fire power which could be unleashed if such a strong point opened up with all guns. A maneuver which took place in a

small sector of the Atlantic Wall helps to obtain a clearer picture. It was assumed that the enemy was making a landing attempt with strong forces, in which he would succeed in landing a limited number of troops and tanks from assault boats while his air force was attempting to support this operation and to disrupt our defensive measures with a considerable number of aircraft. Within a single minute after the alarm sounded, all our soldiers had manned their battle stations. Antiaircraft guns of all calibers opened fire against the attacking planes. The heavy "stuff" from the batteries which had come into action farther back whistled viciously through the air. It was aimed at the heavy naval units of the enemy far out in the open sea. From the hills and dunes, which a little while ago slumbered peacefully in the sunny spring morning, an uninterrupted torrent of missiles poured forth, all directed against the assumed landing point. Machine-gun fire and armor-piercing shells whipped the beach.

The thundering symphony of antiaircraft was halted by the sharp whine of our pursuit planes, which had taken off from a nearby airfield so rapidly that it seemed they had thrown themselves into the air at the first alarm. In just a few minutes they were followed by fighter planes from the same airfield, divebombing, strafing, and finally completely shattering the invasion attempt. When the alarm sounded, the operational reserves moved up from the rear with tanks and motorized units, but the battle had already been decided without them.

The situation at Dieppe is simulated in this maneuver, with one difference—the defensive installations are many times stronger today than they were at that time. The Führer has set a certain date for the completion of the construction activities. Even now the emphatic assurance can be given: the Atlantic Wall stands—at the determined time and in the form originally planned.

The British and Americans might eventually try to invade Europe from the air, but this attempt would stand no better chance of success than invasion from the sea. Terrain which could be used in such an undertaking has been prepared in such a way that an attempted airborne invasion would be considerably handicapped from the beginning. Besides, the guns of the Atlantic Wall also point inland. Near the most important points, especially around U-boat bases, this inland system of fortifications reaches the dimensions and strength of the West Wall.

The men of the Todt Organization have created this Atlantic Wall. In the service of the Führer they have been led by Dr. Todt from the Reich motor highways to the western border of Germany, and from there to all the front lines of this war. Dr. Speer, Minister of the Reich, as Chief of the Todt Organization, is continuing the work of his predecessor with the same energy. When the date rolls around on which these fortifications are to be completed ac-

According to the Führer's orders, many more cubic meters of concrete will have been used than in corresponding installations of the West Wall. Here is an example of standardization methods that have been applied: Through efficient routing of the transportation means, it was possible to lower the necessary amount of fuel to less than half of what had been required to transport one cubic meter of cement when the West Wall was built.

At this hour there are hundreds of thousands of people at work along the Atlantic and Channel coasts. Only a few tens of thousands are Germans. The uniforms of the front-worker of the Todt Organization almost disappear in the crowd. Only the man who puts the finishing touches on the work is always a German. Under his authority is a motley crew of workers of all languages and lands: French and Spanish, Flemish and Walloon, and representatives of many other races. The fez and the turban are just as commonplace as the Basque beret of the French or Spanish style. The front command of the Todt Organization has explained to this army of European workers that it is Europe for which they are working and that therefore each and every one of them will reap the benefits of his labor. Men selected from the French Legion supervise the camps of the French workers. Several purely French organizations, which also participated in construction of the Maginot line, have been able to approach the level of efficiency of German construction firms.

An English journalist said the other day that an invasion attempt would cost not only sweat and tears but also streams of blood. The number of unavoidable casualties would surpass by far the number of English soldiers who fell in the World War. In his own words: "We have to be prepared to sacrifice as many lives as if we had tried to take the German West Wall in a frontal attack." The West Wall did its duty merely through its existence as a threat. Its menace was enough to discourage all notions of attack. In spite of the Anglo-American tendency to brag, in spite of the fact that they are pushed toward action against the Continent by their own public opinion and by their impatient Soviet ally, we shall have to wait to see whether they will take this risk. If they do, the Atlantic Wall stands and is ready for their reception! If they do not, it still has served its purpose, as did the West Wall before it.

On the walls of a strong point on the Channel coast, in the shadow of gigantic long-range batteries and almost within sight of the chalk cliffs of England, the front workers of the Todt Organization have put up a sign. On it are the words: "To be ready is everything." After the men have finished their job there, they will be able to write on the sign the words of Dr. Goebbels: "No admittance to Europe."

Tank Mines

[From the *Royal Engineers Journal* as reprinted in *The Tank* (Great Britain) July 1943.]

THE ANTITANK land mine is the only man-made obstacle so far devised that can stop a tank and is, at the same time, light, portable, and easy to install. A tank charging into a minefield has far less chance of coming out alive than an infantryman advancing recklessly against machine guns and barbed wire.

Tanks, however, do not charge recklessly through minefields, but along lanes from which the deadly explosives have been cleared away. This work of removing the mines is a grim and specialized operation entrusted to the Engineers.

The modern antitank mine is usually a steel-shelled cylindrically shaped little package about 16 inches in diameter, four inches in thickness, and containing some 10 pounds of T.N.T. Exploding under a tank, it will shatter the track, and may breach the tank's belly and maim the crew. The individual portion of T.N.T. is, however, small, and by itself, can control very little area. It is, therefore, thickly sown in minefields consisting of row upon row of hundreds or thousands of individual mines.

The Engineers, to whom the task of clearing a minefield is assigned have a choice of two methods. One is to remove the mines individually; the other is to contrive to make them explode harmlessly.

In the removal method the first step is to find each individual mine in the lane to be cleared. The probability is that the enemy has buried and carefully camouflaged each one. The oldest method of finding a mine is still the surest, and consists of poking and prodding the ground with a sharp-pointed instrument such as a bayonet. The engineer soldier pokes and prods his way along, searching every square foot of ground, and is careful to prod before he treads. He has to bear in mind that the mine has a hard shell (usually of steel), that it is buried only a fraction of an inch deep, and that his mission—and his life—depend upon his unceasing care.

When the prod encounters anything hard, the engineer scrapes away the earth covering, examines the detonator carefully, and decides how to disarm it. He does not know whether he has succeeded until he lifts the mine and hands it to a comrade to carry back to the dump.

Even an old hand at mine removal can never take a single thing for granted. A favorite trick of the Germans is to lay two mines together, one exactly on top of the other. The bottom mine is equipped with a special detonator which is set off by a pull instead of by pressure. The trigger of the pull-detonator is attached by means of a thin wire to the base of the top mine. The idea is that the engineer, having disarmed the top mine, will proceed to lift it and so detonate

the bottom one. The trap is avoided by passing a knife blade under the base of the mine before lifting it.

Mine removal presents the greatest difficulty when it has to be carried out by night or under fire.

To simplify the location of mines, a device known as a mine detector has been invented and is in use in most armies. But the engineer soldier does not like the idea of being burdened with it when under fire. In that case, the old reliable poke-and-prod method is still the favorite. The mine detector, triumph of physics though it is, has its chief use in clearing minefields which have been captured intact.

The second system of mine removal, that of sympathetic detonation, works on the principle of the Bangalore torpedo. The latter, in its usual form, is a 20-foot length of ordinary castiron pipe filled with T.N.T., and fitted with a detonator. If such a torpedo is pushed across a minefield and detonated, all near mines on either side detonate in sympathy. The result is a mine-free path, several feet long, through the minefield. Obviously the path can be widened or lengthened by using additional torpedoes.

There is one catch, however: the nearby mines sometimes fail to explode, and engineers working towards an enemy minefield would do well to bring along prodding rods as an extra precaution.

A new sympathetic detonation method was used by Marshal Rommel when he took Tobruk. He could not afford to waste the time that a Bangalore torpedo attack would occupy. His method consisted in employing waves of dive-bombers who swept in from the west just as the vanguards of the Panzer divisions reached the minefields at the perimeter of the forts surrounding Tobruk. The dive-bombers' targets were the minefields themselves. There was method in their bombing; they dropped their eggs so as to form lanes of craters straight through the fields, from the outer to the inner sides. Through these lanes the Axis tanks swarmed, accompanied and followed by Axis infantry. This was the beginning of the end for Tobruk.

But the ease and speed with which the Stukas handled the situation at Tobruk should not lead to a false impression. Normally, dive-bombers will not be available in sufficient numbers, nor, if available, are they likely to be allowed to operate with impunity. The clearing of mines will continue to be a job for engineer soldiers on the ground.

The mission of the latter will always be made hazardous by enemy countermethods. Chief among these will remain the anti-personnel mine, a lethal device introduced by the Germans in the autumn of 1939. It had an arrangement whereby the mine, on being tripped, was boosted a few feet out of the ground before exploding. This was an interesting feature, since the effect of a bomb detonating a few feet above the ground is much greater than that of

one detonating on or under the surface. The mine was really a shrapnel bomb which, on detonation, covered a wide area with deadly steel pellets. It was tripped by the slightest tug of any of the numerous wires which were stretched along the surface of the ground, hidden by grass and leaves.

One method of dealing with this class of mine—employed by the French—was to drive animals over a suspected minefield.

It is a common practice to intersperse anti-personnel explosives amongst antitank mines, a possibility against which the clearing engineer must always be on his guard. Not only is this true of the minefields themselves, but in any territory reoccupied from the enemy he must be on the watch for "booby traps." This hidden weapon consists of a small charge of T.N.T. and a detonating fuse which is set off by any minor movement, such as a slight tug on a fine wire.

In a sense the booby trap is to the soldier what the antitank mine is to the tank. In the first case, as in the second, the solution to the problem is—engineers. It is up to the engineers to enter the suspect areas, to delve around with knife blades and prodding irons, to ferret out the fine wires, and with velvety touch and iron nerves, to follow them up to the trap itself and render it harmless. It is a business in which the motto reads: "Your first mistake is your last."

Among the major worries of the mine-clearing engineer are mines that do not explode, i.e., dummies. A dummy mine may be a block of wood shaped like the real thing. Buried and camouflaged, such a fake can cause a lot of trouble. Only after he has found and unearthed the dummy, examined it, and made sure that it is not attached to an underlying live trap or mine, can the mine-clearer relax. Even then he cannot know whether the next mine will not be the real thing with all the fancy booby-trap attachments.

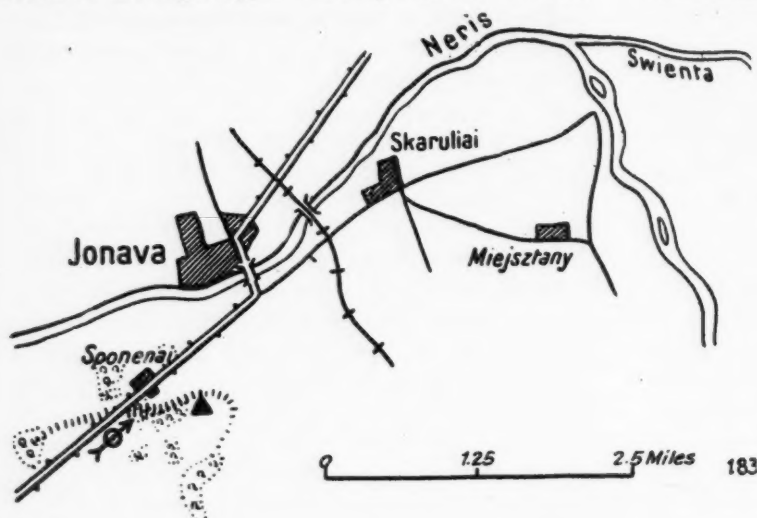
German OP's in Russia: Jonava

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Artilleristische Rundschau*.]

AS WE PUSHED AHEAD on the heels of the enemy and were about ready to attack, we suddenly saw the city of Jonava 2 kilometers (about a mile and a quarter) away on the far side of the river Vilija (Neris) (see sketch). Just at this moment a rain of shells from the enemy artillery forced us back for a distance of 200 meters to Sponenai. There the regimental commander ordered: "2nd Battalion to the left of the highway; heavy battalion to the right of the highway! Observation post positions even with the village!"

I looked for a place for the observation posts. The wood not far to the northeast of Sponenai was

a handy location but it adjoined the highway, and on account of its slight extent it seemed too conspicuous. Besides, the view from it was limited. It seemed as if the view would be good, however, from up along the edges of the woods on the steep slope south of the highway, and this proved to be true.



From here we had an excellent view down into the valley where every detail of the city of Jonava, the river, the heavy railway bridge which crossed it, and the adjacent terrain in both directions was visible.

As we were engaged in establishing ourselves here, unnoticed by the enemy, the wood down below just north of Sponenai was already under fire and soon the surrounding farm houses were burning. In the evening our attack on the enemy positions was carried forward as far as the railway line to the southeast of Jonava.

Pleased with our ideal observation post, we were soon, also, to learn its disadvantages. We now could see how important flank security is in the case of narrow, deep breakthroughs into the enemy's positions. The Russians did not dare to attack openly, but now, as the shades of night approached, they felt themselves in their element. The bushes and edges of the broad fields which extended up to our position suddenly became alive. Bullets began flying about our ears from every nook and corner.

We gained a few moments respite by means of a counterthrust carried out by what forces we could spare from the infantry, and by the men of the 12th Battery with their light machine guns. But the little formation was powerless against this flank attack which flared up time after time and always in a new spot, fed from the depths of the endless forest. We were therefore given the liberty of withdrawing, and a little later the order came to evacuate the position. But the whole battalion had not yet reached the route of march when several fresh battalions of heavy motorized artillery arrived to reinforce us. Thereupon we went back to the old positions.

These operations carried me past the observation posts of another battalion which, the same as we, felt the threat to its flanks, in this case from the left, for the division's left flank also was open. To be sure, the broad river and open terrain protected it from direct, close attack. These observation posts,

the same as ours, were set up on a steep slope which rose from alongside the route of march, only farther to the rear. They had a good view in the direction of Jonava and were well concealed from the view of the enemy. In the direction of the left flank, however, owing to the absence of all shrubs and bushes, they were entirely in the open and everything had to be kept close to the ground. It was quite impossible to go to them, come from them, or move about in the vicinity so long as the enemy was still on their flanks, a proof of how necessary it is in choosing a location for observation posts to consider all possibilities.

Although on the following day our observation posts were not discovered by the enemy artillery, the batteries were heavily bombed. Owing to the closeness of our advanced observers, two of the enemy batteries which had been especially troublesome to our infantry were silenced. Lieutenant B. discovered an AA battery which was taking a hand in the ground combat and immediately silenced it. Lieutenant S. received a report from the infantry of the discovery of an enemy battery concealed in the woods. It was brought under map fire using a Russian 1:100,000 map. Later, as we advanced, it was evident that the shots had struck exactly where they were supposed to.

The constant threat to our right flank had now been eliminated. In the evening an infantry regiment threw the enemy, who was numerically far superior to us, back into the bend of the Neris. In order to catch the enemy forces during the night as they were retreating northward, one of the battery chiefs was sent ahead on his motorcycle to the railroad bridge, which crosses the Neris at the upper part of the river bend east of Jonava, as an advanced observer. In the last moments of daylight he managed with a very few shots to get the artillery fire adjusted onto the highway crossing just to the east of Miejsztany. To be sure, he could not see the columns in the darkness as they approached this point, but from his high station he could hear them coming many kilometers away and he met them at the highway crossing with ricochet fire.

Motorcyclists in Combat

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Major General K. Trufanov, Soviet Army, in *Krasnaya Zvezda* 11 June 1943.]

EXCEPTIONAL mobility combined with sufficient fire power distinguishes motorcycle units among other types of troops. These qualities also determine the tactics of motorcyclists.

Not to be ignored, also, is their ability to filter through enemy combat formations. Thus a group consisting of only eighty of our motorcyclists maneuvered three days literally in the midst of hostile motorized troops. It penetrated 180 kilometers into the German rear, firing on roads, blowing up bridges, and returning without losses.

The tactics of motorcyclists is similar to that of cavalry. All their missions must be calculated on a bold, short thrust, on a skilful combination of fire and rapid maneuver. But there have been cases when motorcycle units were assigned sectors of the terrain and were placed to defend them, this highly maneuverable arm being converted into ordinary infantry. However, those commanders act incorrectly who, without special necessity, throw motorcyclists into battle against strongly fortified positions, for this leads to unjustifiable losses in personnel and matériel.

As experience shows, motorcycle units, large and small, can be used in all types of battle. Most typical are actions within the composition of an advance detachment. When the main forces undertake a march intending to reach an area of concentration, motorcyclists cover this region as well as the important tactical positions situated 25 to 30 kilometers and more from the starting point. They can perform this task more easily if reinforced by tanks, guns, and mortars.

Activities of advanced detachments of motorcyclists are based on wide maneuver and bold decision. When the enemy succeeds in preventing us from seizing this or that position, the commander of the advance detachment orders supplementary reconnaissance and, estimating the enemy strength and his state of preparation for battle, begins a resolute attack without stopping to reorganize; the attack must be supported by the fire of mortars, accompanying guns, and tanks. Possessing high mobility, motorcyclists can quickly feel out the weak spot in enemy combat formations and strike this spot, combining frontal attack with envelopment of the flanks and infiltration through combat formations of the defender in order to surround him.

Having seized a position, the commander of the advance detachment at once consolidates it and sends out reconnaissance in front and on the flanks. The distance of reconnaissance is 10 to 15 kilometers. Further actions of the detachment will be determined

by the particular situation and the task assigned. On encountering superior enemy forces the advance detachment is often compelled to employ methods of mobile defense. Shifting from one position to another, motorcyclists, with bold action on a wide front, harass the enemy and limit his field of action.

Not finishing a fight in one position, they can easily disengage from the enemy and proceed to a new position, there to meet the attackers again with organized fire. Special attention must be given to the protection of flanks so that the enemy may not be able to envelop the motorcyclists with his mobile groups and forestall them from moving to a new position. Generally speaking, by using their mobility, motorcyclists can almost always escape encirclement.

In conditions of increasing battle tempo the collision of advanced detachments may quickly grow to a battle between the main forces. It is important, therefore, that the success attained by the advance detachment of motorcyclists be promptly supported and developed, thereby imposing our initiative on the main enemy forces and compelling them to fight under disadvantageous conditions.

Motorcycle units are useful in breakthrough of hostile defense when included in the echelon developing the breakthrough. Part of the motorcycle elements can be used in close cooperation with tanks in the breakthrough action. In this case the motorcyclists act in small, dispersed groups (platoons or squads), moving directly behind the tanks, between them, or on their flanks. Utilizing their mobility and fire, the motorcycle elements liquidate surviving centers of resistance and reviving firing points or, if necessary, guide the tanks to them. Such action by motorcyclists may seem risky. Of course, the risk exists, but certainly the tank-borne infantry seated on the armor of tanks is in a less favorable position, and still they reach the designated objectives and fulfill their task in battle. Motorcyclists enjoy greater freedom of maneuver and are more mobile and flexible than tank-borne infantrymen. Hence there is no basis for fearing that they will be annihilated by enemy fire, the more so because we are speaking of that stage of battle when an avalanche of tanks descends on the enemy and the enemy defensive fire does not have great strength.

When parties of motorcyclists are assigned for fighting in close cooperation with tanks entering a breakthrough, the motorcycle unit as a whole stays in a group ready for hasty pursuit of the enemy. As soon as success is observed, i.e., when the enemy starts withdrawal, it is essential to take all measures to prevent his getting away, forming a column, and taking up the next position in an orderly fashion under the cover of rearguards. For this purpose, small motorcycle groups are sent forward, reinforced by tanks and self-propelled artillery.

Actions of such groups must be distinguished by

boldness and resoluteness. Sudden flank thrusts and ambushes find wide application. Enveloping the enemy from the flanks or slipping between his columns, motorcyclists reach his communications, cut off his retreat, and try to press him toward impassable places (swamps, water obstacles, etc.). Such action is dictated by the very nature of the motorcycle troops. If the situation demands it, motorcyclists must boldly take risks, sometimes accepting battle against unequal odds. Behind them, of course, move mechanized units which can crack and destroy the halted enemy.

In defensive battle, motorcycle units are used with great effect as mobile reserves for parrying thrusts and for liquidating parachutists and infiltrating hostile groups. Thus, in one sector, when Germans dropped a group of parachutists into the positions of our troops, motorcyclists from the reserve were sent out immediately against them. Twenty minutes later they reached the landing party which had not yet succeeded in taking up its combat formation. After a short battle the party was completely liquidated. It is clear that infantry could not have solved such a problem with as great speed.

Presence of strong mobile reserves is indispensable for modern defense, for counteraction against massed blows of mobile hostile forces. With the help of such reserves, having within their composition motorcycle units, tanks, and motorized infantry, it is always possible to nullify enemy attempts to penetrate to the rear of our defense, which the Germans always try to do.

Such are the general outlines of the combat activity of motorcyclists. It is always necessary to strive to use to the utmost their most valuable combat quality—high mobility and capacity for rapid maneuver on the field of battle.

Modern Army Supply

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from an article by Colonel Krumpelt in *Deutsche Allgemeine Zeitung* 13 February 1943.]

This exposition of supply fundamentals is one of the clearest of those that have come to our attention, and it parallels our own supply concepts in most respects.—THE EDITOR.

THE SUPPLY SERVICES have the task of bringing up to the fighting troops everything they need in battle, for their nourishment and for maintenance of their material equipment. If the supplies necessary for a modern army are not successfully brought to the right places at the right time, the operative planning is hindered or completely stopped. The supply services thus constitute, to a great extent, the basis for the completion of an operation. Because of material considerations, supply problems impose on

the operational command limits which depend essentially on the extent and capacity of the means of transportation (railroad and motor transport), and the efficiency of the war economy.

Military history demonstrates to what a decisive degree the question of transportation influences both the operative command and the supply services. Lacking rapid and efficient transportation, Frederick the Great had to adjust the plans of his campaigns to the economic ability of the regions to be conquered. He was compelled to secure his supplies in the assembly area and in the area where operations were to take place long before the start of his campaigns. Since here it was primarily a question of provisions—ammunition was used in very small amount, fuel not at all—depots for assembly and advance were installed or secured in hostile territory by disguised purchase. In winter, war could hardly be waged at all, chiefly because of the supply problem. The armies went into winter quarters. Supply was, therefore, predominantly dependent on the exploitability of the hostile country.

The introduction of the railroad brought a fundamental change. In the war of the Seventies and the World War it was the pulsating artery which brought to the armies the flow of strength for battle from the homeland. The delivery of supplies was carried on almost exclusively by railroads. The operative war leadership became considerably freer and more independent because of the great possibilities of supply afforded by the railroad. Without the railroad, and with the preponderant use of automatic weapons and massed artillery in the World War, the high command would not have been able to bring up the necessary supplies. The consumption of fuel was still insignificant. Supply in the World War was based almost exclusively on the railroad and horse-drawn vehicles. Motorization was only at the beginning of its development. The practical proposition held true that any operation which was more than 100 kilometers [62 miles] from railroad points stalled because the other available means of transportation could not deliver the necessary supply any farther.

Today we have an army which stands at a technical height never before attained. Whole panzer armies with enormous requirements of fuel and consumption of matériel of all kinds, air fleets using up tremendous fuel, armies with weapons of very great rapidity of fire have to cross extraordinary distances in the shortest time. The requirements in technical equipment of all kinds, such as motor vehicles with supplies of spare parts and repair facilities, weapons, equipment (for example, engineering equipment, signaling apparatus, gas protection equipment, etc.), are extreme both as to type and amount, and are complicated in their individual demands. Just think of the infinitely many more types of motor vehicles coming from the whole European area and of the greatly varied spare parts necessary for their repair.

Winter demands special equipment (sleds, skis, calks for the horses' shoes, etc.), and huge amounts of winter clothing, winter housing accommodations, and heating. In addition the hitherto unfamiliar needs such as road-building, long-distance telephone construction organizations, political and administrative organizations, organizations for economic exploitation, and corporations for the reconstruction of the country are involved. In addition to all these extended problems, there comes what is probably the severest demand ever made on army supply, which moves with increasing slowness in rapidly progressing operations such as those in the east with their long lines of communication.

The motor vehicle brought the desired aid. The truck holds an equal place with the railroad, in this second World War, as a new connecting link between the front and the homeland, or between the railheads and the front. It has broken the 100-kilometer operative restriction of the World War and, starting at the railroad terminal points, has overcome distances and has freed the operative command from the fetters of restriction, giving it the opportunity to operate at will. There have arisen such concepts as "runways," serving as routes for motor vehicle transport traffic; supply centers which, in addition to other work, secure the fuel supply for vehicles; traffic organizations which facilitate the uninterrupted flow of transport columns; road and bridge construction organizations which take care of road repair and maintenance; repair installations on the "runway" which repair broken-down vehicles; and finally an organization which operates the transportation according to plan, just as the operations office of the railroad runs trains according to schedules with the help of the telegraph. All in all, the motor vehicle constitutes a second transportation facility which is more flexible and independent than the railroad because of the network of roads which in case of necessity can supplement the activity of the railroad even in the latter's domain, and because this facility too reaches back into the homeland. Mention must also be made of the most modern method of transportation, aircraft, which is often the last resort in difficult situations. It can already be stated that the flying machine has not only fulfilled, but has far surpassed, every justifiable expectation imposed upon it.

So much for the means of transportation. For the establishment of harmonious cooperation of the means of transport is only a small, if important, part of the tasks of the supply services. If the goal is to be attained of having the fighting troops receive everything they need at the right place and at the right time, then it is clear that back in the homeland the things needed by the fighting troops at the moment can not be correctly and promptly assembled in railroad trains. In addition, the running schedules of trains over great distances are too long. Before

the trains can arrive the situation at the front has often completely changed, and with it also the needs of various supplies. The more restricted the performance of the railroad network (effects of winter, of the hostile air forces, etc.), so much the more must safety factors be considered. The longer the distances from the railheads to the front become, so much the more must intermediate depots be established which are able to compensate therefor.

It is therefore impossible to move things from the homeland to the front in one railroad train. Groups of intermediate supply depots must be established, geared to the situation and able to provide assistance where the need develops most urgently. Between the homeland and the front there thus results a net of depots which permits the command to shift the main effort of supply freely to such places as the command requires. Even in the realm of the railroad a similar system must prevail. Whether the goods are stored in trains ready to move or in depots alongside the railroad is primarily a question of the space over which they are to be transported. The system of safety factors from the railheads to the front must be organized much more definitely; for here the needs appear most rapidly and most urgently. The demand for individual items is, in its heterogeneity, greatest at the front.

It is the task of the supply command to organize the depots with foresight with respect to locality, type, and number in the places where the needs will presumably appear, where the possibilities of delivery are favorable for the troops from the point of view of traffic and reasonable with respect to distance, and where the most urgent demand can be fully met at any time. Here the need of fuel and ammunition plays the chief role.

The executive organs of supply are included in the quartermaster service. The chief supply executives in the various branches are general staff officers in the commanding staff. The lowest echelon of supply—along with the fighting troops—is the division. The division I-b* directs the supply service of the division troops. To him belong not only the direction of transportation (direction and movement of columns), delivery of ammunition, fuel, provisions, weapons, and equipment, but also the care and evacuation of the wounded, the supply and care of horses, delivery of clothing, mail, construction material, requirements for housing, and much else. For these many branches the quartermaster has at his disposal technical and expert assistants, such as directors of supply, quartermaster officials [these are functionaries, not officers, but with officer rank.—Ed.], ammunition and motor-vehicle officers, doctors, veterinarians, field postmasters, and so on. The

* The Division I-b corresponds in general to the American G-4. The German Quartermaster Service includes most of the supply and maintenance functions of all of the American Supply Arms and Services.

supply of several divisions is regulated in higher echelon by the corps quartermaster. He directs the needs of the divisions according to the development of the tactical situation, concentrating supply troops at the points of the main effort, directing the uniform establishment of hospitals, conducting the planned flow of supply, and requisitioning the expected needs according to the location of the main effort.

The army with its army quartermaster is the chief purveyor of supply. Here all the forces of supply flow together. It is so organized that it can conduct supply independently in a theater of war of limited size. In the Serbian campaign, for example, the army was completely self-contained, and it organized supply in this theater independently and with full responsibility, in direct collaboration with the army command. The army quartermaster indicates the main line in the flow of supply. He takes care of requisitioning trains for transport, he organizes the forward movement of goods in the large transportation space, he determines where the "runway" is to be laid, he sets up large depots and organizes the delivery through divisions. He establishes the large installations, such as hospital bases, veterinary hospitals, and bases for provisions, ammunition, and fuel. He organizes the exploitation of the country. For these purposes he is furnished with many troops, which are included under the collective name of "supply troops." They are mainly hospital troops, veterinary troops, administrative troops (baker and butcher companies, commissary services, etc.), ammunition services, motor vehicle repair companies, field postal services, and above all, services of supply, particularly the truck transport columns with their supply battalions detailed for loading and unloading, fuel services, field repair shops, etc.

The greater the area of operations, the less can the central office of supply in the high command of the army direct everything itself. While in a small theater of war, such as Serbia, the army is the sole carrier of supply, under large-scale conditions as in the east an intermediate link is needed. That is the army group. The quartermaster of the army group is the connecting link between the high command and the army. He is in fact the connecting link between the homeland and the front, and he organizes the movement of railroad trains to the armies. He gears the needs to the operations and the resultant supply needs, and in accordance with the over-all picture sends the trains where the situation demands. In cooperation with the quartermaster general, who directs the whole supply in the high command of the army, he requisitions the trains and sends them to the front.

Finally, the quartermaster general in the high command of the army is the central organization of army supply, and procures the necessary supplies in the homeland. He is the mediator between the needs of the army and home production. In general, he directs

the distribution of goods and the use of supply troops, and sees to it that the needs for the conduct of war are promptly prepared and made available in the homeland.

The whole work of the echelons of supply serves the front; it is achieved without fanfare by unpublicized officers of the general staff and is overshadowed by the deeds of the fighting troops. In the multiplicity of needs, it is not easy to satisfy all demands of the front in all situations. Often certain goods are not at hand or are not available because of transportation. Here improvisations must be made and what is lacking must be procured from the country by skilful organization. Often a sudden great need occurs where it was not to be expected. Here the quartermaster must take precautions beforehand. By extensive distribution of supplies, foresighted organization of the structure of supply, and with mobile reserves, the quartermaster takes measures to help where the unusual need occurs. He must anticipate how the operation is proceeding and shift his base of supply, that is, the mass of goods and supply services, considerably ahead of time in the direction which the operation will take. Therefore, the officer who is placed in the controlling position of service of supply must be tactically and operatively trained. He is the most faithful companion of the operative command and the best friend of the soldier fighting at the front.

"Ferdinand": A New German Self-Propelled Gun

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by K. Andreev, Lieutenant Colonel of Engineers, Soviet Army, in *Krasnaya Zvezda* 25 July 1943.]

IN THE July battles on the Soviet-German front the Germans began to use a new self-propelled gun called "Ferdinand." This seventy-ton weapon on a special chassis has fairly strong over-all armor protection. The thickness of its armor on the turret is as follows: forward wall, 200 millimeters; shield leaf of spherical mounts, 110 millimeters; side wall, 95 millimeters; rear, 85 millimeters. The forward armor of the body is 170 millimeters; side, 160 millimeters; bottom, 40 millimeters. The armament consists of an 88-mm cannon mounted in a fixed turret, and an "MG-42" machine gun. Observation is made possible through three periscopes, one each for the commander of the vehicle, the driver, and the gunlayer. There are no visual slits. For outside communication there is a radio receiver and sender; for internal communication, radio microphones.

The sketch shows that the weapon and mount consist of a driving compartment, a motor compartment, a combat compartment, and a transmission compartment. Six men comprise the crew: the com-

mander of the weapon, a lieutenant (tank or artillery), a gun-layer, a mechanic-driver, a radioman, and two loaders. The motor compartment is located near the center of the body, and in it are placed two parallel, air-cooled gasoline engines (type Mai-

stops. Half the guns fire simultaneously. Direct fire range is 3,400 meters; most effective fire from the stationary position is at distances of 1,200 to 1,500 meters.

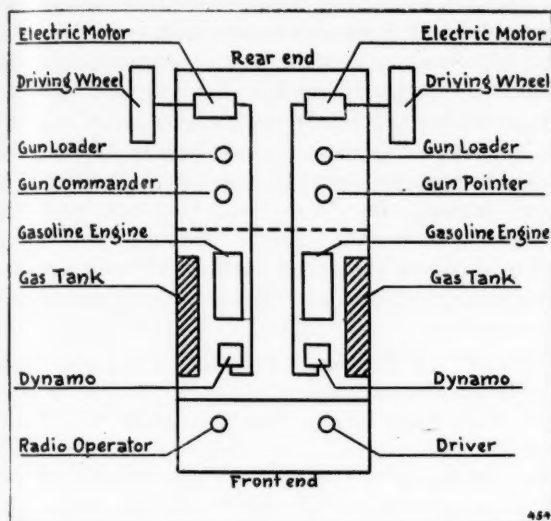
Evaluating the qualities of this new German self-propelled gun on the basis of experience of combat action, it is possible to draw the following conclusions. The powerful gun has faults which make it vulnerable for all antitank agents. Its great overall weight and the insufficient power of its motors account for its lack of speed. Its maneuverability across terrain is limited. The motors heat up greatly, and treads often jump off. Getting stuck in ditches and along the sides of roads is a relatively frequent occurrence when the vehicle is used on the battlefield. One captured enemy soldier from a battalion of self-propelled "Ferdinand" guns revealed that four out of his company's nine weapons went out of action on the march because of technical failures.

The cannon, powerful by its ballistic data, has deficiencies; it can only aim point-blank from stops, firing while on the move being ineffective. Poor visibility and limited view from the combat compartment (the crew can see forward only) makes it possible for tank destroyers to approach easily. In the rear wall of the turret there is an aperture, constantly open, for the ejection of shell cases in firing. Taking into account this peculiarity of construction, the tank hunter can easily put the crew and weapon out of action with the help of antitank and even hand grenades or bottle of inflammable liquids.

Experience of combat shows that the most effective methods of fighting the "Ferdinand" are concentrated artillery fire, using armor-piercing incendiary shells against the dome of the weapon and the gasoline tanks located in the center of the body and utilizing all calibers against the running gear of the weapon (treads, driving and steering wheels, bogies), on the gun, and on the optical apparatus.

Tank hunters, taking advantage of the limited visibility from the "Ferdinand" and the weakness of its automatic fire (one machine gun up front with the radio man), must attack the weapon from the side and rear. They throw grenades and bottles with inflammable liquids on the motor compartment, on the roof of the turret, into the dome, and into the rear aperture of the turret, and also blow up the running gear and under side of the weapon with antitank grenades and mobile mines.

Experience of recent battles has shown that this new example of German technology, just like the "Tiger" tank, can be destroyed by our soldiers skillfully combining the fire power of their guns with flexible maneuver and warlike cunning.



bach, about 300 h.p. each) which work independently of each other and operate the armature of a dynamo. The current produced by the dynamo is led to an electric motor which turns the driving wheel (forward).

The weapon has an electric transmission which is a technical novelty and deserves careful study. The presence of two engines, two dynamo-machines, and two electric motors shows that each driving wheel has its power aggregate working independently. The running figures of the weapon are: maximum speed on highway, 20 kilometers per hour, average speed not exceeding 10 kilometers; refueling distance, 100 kilometers; angle of ascent that can be surmounted, 30°; ford depth 0.7 meters.

Let us analyze briefly the organization and combat use of the "Ferdinand" gun. These weapons are organized in heavy tank destroyer battalions. The battalion consists of three artillery companies, a headquarters company, a repair company, and a train. The artillery company consists of three platoons with four guns of the "Ferdinand" type in each. Two more guns are with the company commander, making 14 weapons in the company. The battalion headquarters company has two self-propelled guns, a "T-III" tank, and four motorcycles. Thus in a tank destroyer battalion there are in all 44 guns and one "T-III" tank.

The heavy tank destroyer battalion is used for breakthrough of the defense line and for fighting tanks and artillery. In the attack it moves in two echelons: in the first, two artillery companies advance in a straight line with intervals of 100 meters between weapons; in the second echelon is the third company, also in a line. Fire is conducted from short

The Royal Electrical and Mechanical Engineers in Action

[From an article in *The Army Quarterly* (Great Britain) August 1943.]

A PREVIOUS article in the May number of *The Army Quarterly* has given an account of the framework of the Royal Electrical and Mechanical Engineers. An attempt will now be made to give the reader a picture of the New Corps at its daily work in a theater of war. This work naturally falls into two categories—that carried out in the Base and Line of Communications installations and that carried out in the fighting formations. Roughly one-half of the R.E.M.E. [Royal Electrical and Mechanical Engineers] personnel of a force will be found in each category. Another rough proportional value is that required to maintain different types of equipment. It will be found that of the total maintenance effort some fifteen to eighteen percent is put into the manufacture of spare parts or special items of equipment; forty percent is absorbed by "A" vehicle repairs; thirty-three percent by "B" vehicle repairs; and the remaining nine percent by the upkeep of armaments, small arms, instruments, wireless and radio equipment.

It may be as well to mention the system whereby the repair service in the field is divided into four zones or echelons, the first being situated right forward with units, the work developing on unit artificers assisted only by Light Aid Detachments from R.E.M.E. This constitutes a quick recovery and repair service, and nothing which requires more than a few hours work or the replacements of minor assemblies is normally tackled here. The 2d echelon repairs involving replacement of major assemblies and the execution of more ambitious repairs is carried out in the R.E.M.E. workshops, provided on a scale of one per armored, tank, or infantry brigade. The 3d echelon is provided primarily to strip the worn or damaged assemblies exchanged in the brigade workshops and to render them serviceable by building up anew with fresh components. It also acts as a "long stop" to the 2d echelon shops, sharing their work during rush periods, and sometimes even taking their places in emergency. Finally, there is the 4th echelon, represented by the large Base and Advanced Base Workshops, with ample plant and a fixed site, where complete overhauls and such manufacturing work as is absolutely essential are undertaken. These shops, too, carry out all necessary modifications to any equipment, which may be dictated by experience or by special conditions. An essential organization to enable the casualties to pass along from echelon to echelon is the Recovery Service, which will be dealt with separately.

Taking the Base Workshops first, these are large establishments, each employing some thousands of

men, and sub-divided into sub-shops to deal with different types of equipment, i.e. one for "A" vehicles and one for "B" vehicles, one for armaments and instruments and one for general engineering. The work here is of great interest to the engineer, but not such as to claim much of the limelight. Foresight, planning, and incessant hard work are the main features. In most theaters of war, considerable dilution of Royal Electrical and Mechanical Engineers with local civilian or locally enlisted personnel is effected. One such workshop in the Middle East, for instance, employs personnel of seven different nationalities. The Chief Electrical and Mechanical Engineer (C.E.M.E.), as the Commanding Officer of the unit is styled, must therefore be something of a diplomat as well as a technician of no mean order.

Moving "up the line" past the Advanced Base Workshops, which form a sort of outpost to the Base Workshops, which are also static and fully equipped, one comes to the 3d Echelon Shops situated in the Army or Corps Area. These shops are actually Corps Troops, but their location (they are semi-mobile) is often a matter of mutual adjustment between Army and Corps Headquarters. They are semi-mobile only because, not being called upon to move frequently (normally at not more than fortnightly intervals), their transport tail is cut to render them movable only in two or three lifts. This semi-mobile status is something of a handicap when Armies take to the road in the manner habitual to the 8th Army, but in these particular instances the availability of captured enemy transport has proved a saving grace on many occasions. Frequent moves, however, necessary as they sometimes are, act as a serious brake on output and are, of course, always avoided when possible.

Ahead of the 3d Echelon Shops and situated in the Divisional Area are the Brigade Workshops. These are Divisional Troops, but are normally allotted to the brigades which they serve. They are fully mobile and can move at short notice; but in the interests of planning and output it is unwise to put them on less than four to six hours' notice. Sometimes in very mobile operations, these shops leapfrog one another so that one at least is always open and operating at full blast. The equipment of these units, as also that of the 3d Echelon Workshops, takes mainly the form of R.E.M.E. machinery lorries of various types, adapted to the needs of the equipment they service, the unit thus lending itself readily to organized dispersal in order to present a difficult target to enemy aircraft and artillery. With their rifle power and their antiaircraft and antitank small-arm equipment these units are able to give a good account of themselves if attacked, and occasions have not been wanting when they have had to show their metal.

They work in close liaison with the Light Aid De-

tachments in front of them and, in the advance or withdrawal, they throw off a small detachment partly known as an Advanced Workshop Detachment which moves level with brigade headquarters and supplies a useful stiffening to the Light Aid Detachments and unit artificers. These Advanced Workshop Detachments are necessarily highly mobile, and consist rather of a number of servicing detachments with a pin-pointed Headquarters than a cohesive field workshop. They perform a useful function in preventing evacuation of more than fifty percent to sixty percent of casualties back to their parent workshop. The Brigade Workshops, taken as a whole, comprise what one might call the backbone of the Royal Electrical and Mechanical Engineers' organization; taken in conjunction with the 3d Echelon Shops the dividing line of work between 1st, 2d, and 3d echelons is purposely drawn blurred in order not to fetter the hands of engineers on the spot in tackling almost any kind of repair, the immediate execution of which is essential to the success of an operation. Certain broad lines of demarcation, as has already been mentioned, must, however, be laid down to enable the stores required by these different workshops to be scaled to some degree of accuracy. Command of a Brigade Workshop leads automatically to the appointment of C.R.E.M.E. [Chief?] of a formation, which itself is a *sine qua non* to the officer who hopes to graduate to the technical administrative appointments at the Headquarters higher formations.

Finally, we come to the Light Aid Detachment, the small Royal Electrical and Mechanical Engineer unit commanded by a subaltern or Warrant Officer, which is wholly identified with and under the same command as the unit, regiment, or brigade which it serves. It is the unit commanding officer's standby, and the Commanding Officer of a Light Aid Detachment works in close collaboration with the technical adjutant of his regiment if with an armored regiment or tank battalion, or with his equivalent in a field artillery regiment or an infantry brigade. To the Light Aid Detachment falls the task of locating casualties and, if possible, of repairing them on the spot. If this is impracticable the casualties are dragged to a place where they can be dealt with by the main body of the Light Aid Detachment, or on to an "axis," i.e. a specified route along which the formation is moving, whence they can be recovered back to the Brigade Workshop or further to the rear; one of the chief functions of the Light Aid Detachment is to keep the roads clear for movement. Information as to casualties should reach the Light Aid Detachment from the unit concerned but, in battle, considerable reliance must necessarily be placed on the initiative of the Light Aid Detachment commander in reconnoitering for such casualties and using his own judgment. This command is one of the finest forcing houses for the young R.E.M.E.

officer. The work calls for stamina, initiative, an eye for country, and a knowledge of his weapons *on the part of each individual* for much of the work is bound to be of an individual nature.

The work of keeping the minefields clear of wreckage or of immobilized vehicles has already received considerable public notice; no less important nor less hazardous is the location and salvaging of damaged equipment in close proximity to the enemy, and many a tank and gun has been so snatched from under the very noses of the enemy. Sometimes much stalking and considerable planning has been rendered abortive by some adverse turn of fortune's wheel, and amongst such abortive effects may be mentioned a plan, almost successfully completed, for taking intact one of the earliest German Mk. VI (Tiger) tanks to be knocked out in Tunisia. After a stalk occupying one night and a day's lie-up awaiting darkness for the actual removal of the tank, the Light Aid Detachment party were denied their success during the last few hours of daylight through circumstances over which they had no control. More frequently, however, as is testified by the astonishing proportion (eighty-three percent) of tank casualties restored to their owners without evacuation during the difficult opening stages of the action at El Alamein, the stalking and the plans are alike successful.

The proper execution of this task of recovery and rapid repair plays a very great, one might say almost a dominant, part in sustaining the momentum of any attack in which armored units are engaged, and it is fair to say that the successful performance of these functions in both the 1st and 8th Armies has done more to win the confidence of other arms of the Service in the Royal Electrical and Mechanical Engineers than any other single factor.

Now we must deal with the recovery companies. Although the Light Aid Detachments and the Brigade Workshops have a certain holding of recovery vehicles and tackle, they cannot afford to "look over their shoulders" and carry out recovery further back than the divisional area. Some organization is, therefore, necessary to cover the gap between Brigade Workshops and rail or road heads whence the movement of the casualty becomes the responsibility of the Line of Communication organization. This gap is bridged by the Recovery Companies, R.E.M.E., which are equipped with ample transporters, winches, etc., for the work, calling if need be on the Tank Transporter Companies, Royal Army Service Corps, for assistance in the actual carrying. These recovery companies are allotted on a basis of one per corps and are divisible into divisional sections. During intense fighting it is often necessary to put some of these sections into divisional areas to help out the recovery elements of Brigade Workshops and Light Aid Detachments, but in principle recovery is by unit recovery vehicles or by Light Aid Detachments to an axis, by Brigade Workshops to brigade work-

shop sites or possibly to a recovery point in rear of them, and by recovery company from recovery point to rail or road head.

Recovery, again, is a grand school for the young R.E.M.E. officer, the work calling for brains, brawn, and guts, and most of the battle casualties in the Corps occur in the Light Aid Detachments or in recovery sections working with them.

The Royal Electrical and Mechanical Engineers is, compared with other corps and regiments of the British Army, an infant in arms and great care has

been taken to make the doctrine of recovery and repair a flexible one, permitting of minor adjustments in the light of experience.

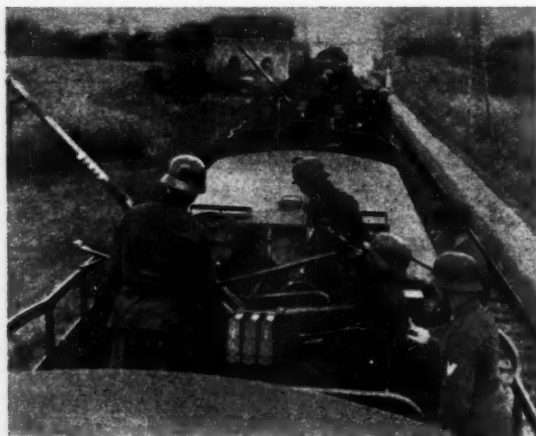
This description of the corps activities in operations is, therefore, liable to become out of date in minor particulars as time goes on, but it is felt that the turbulent nursery days of the new infant have given its nurses and tutors a sound, broad canvas on which to sketch in the principles which should guide the corps in what one hopes and believes will be a long and useful life.

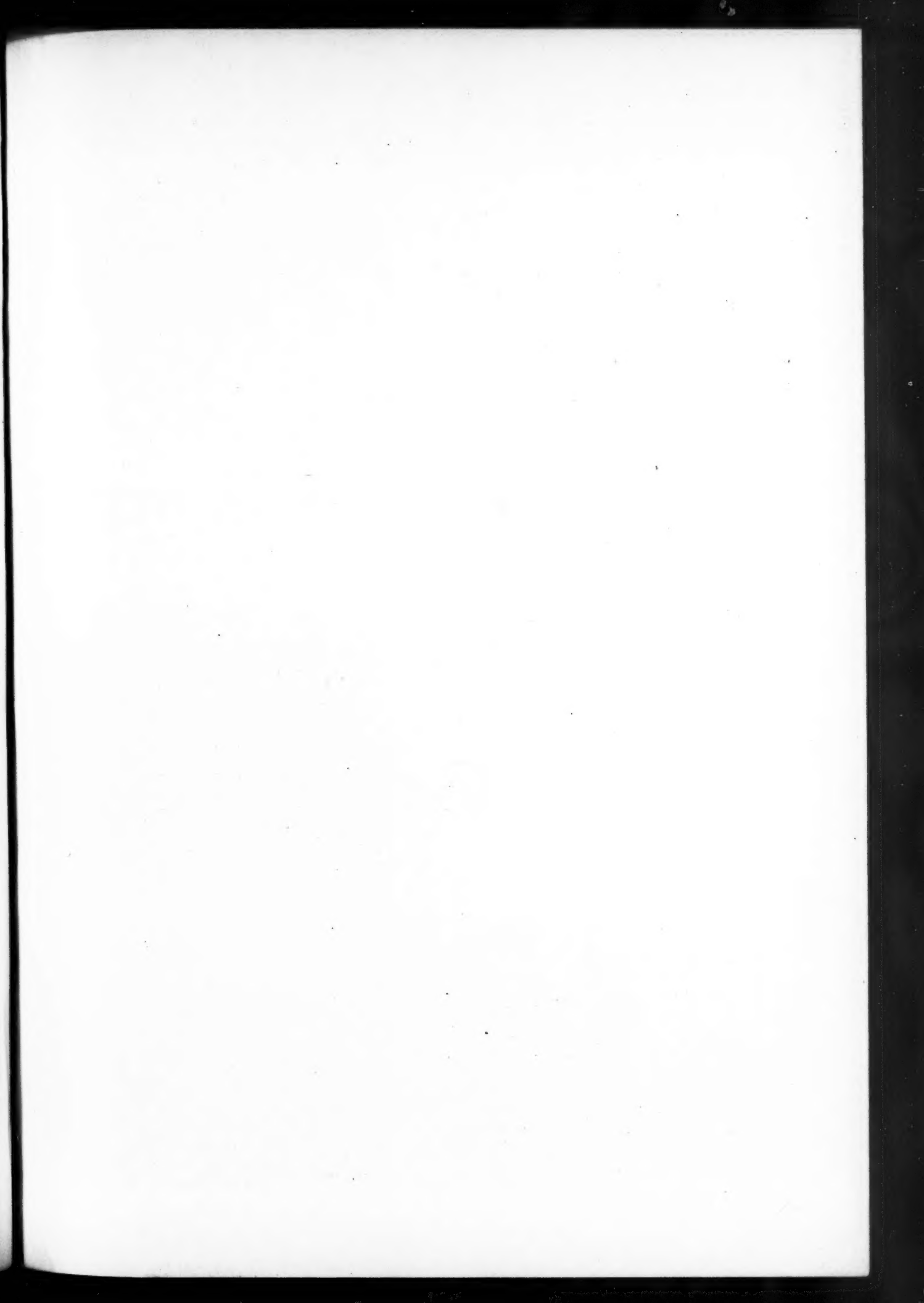
German Antiaircraft Guns on Railway Mounts

TO OBTAIN greater mobility in defense against air attacks, the Germans have mounted 88-mm antiaircraft guns on railway carriages. The picture at the right shows a battery of four of these guns in firing position. On the train that accompanies the guns are cars that contain living quarters for the crews as well as all the fire control equipment. The picture below to the right shows this equipment mounted on a flat car. The height-finder appears in the lower left-hand corner of the photograph, the battery commander's telescope is in the foreground, and a director or data-computing instrument is in the background.

Directly below is a view of a German railway train protected by light antiaircraft guns mounted on the cars. With the critical shortage of locomotives in Germany, every means is being taken to provide them with all possible means of defense against attack from the air.

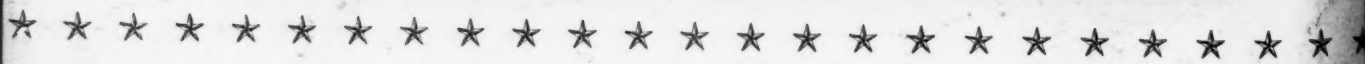
[From *Die Wehrmacht* 17 March 1943 and *Hamburger Illustrierte* 1 June 1943.]







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